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Chironomidae of Japan : Checklist of Species Recorded, Key to Males and Taxonomic Notes

日本及び東アジア産ユスリカ科のカタログと雄成虫の検索表

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PREFACE

It is a great pleasure that a scientific report entitled "Chironomidae of Japan: Checklist of Species Recorded, Key to Males and Taxonomic Notes" has been completed by Dr. Manabu Sasa, one of the former directors of our institute, and is ready to be published as the vol.125 of the institutional scientific reports.

This is the final or summary report of the series of studies on Chironomidae, which Dr. Sasa and his colleagues have investigated and studied with enormous efforts last over ten years. During the period, they have discovered nearly two hundreds new species of Chironomidae in Japan, and studied the records in some east Asian countries including Taiwan, Korea and Sakhalin. The most crucial and interesting point of the studies is that they have found a definite correlation between the certain species of the Chironomidae and the environment, or, for instance, the degree and of quality of pollutions of each part of a certain river water. In other words, they have discovered the fact that the chironomid species can be the indicator animals of the environment, which many scientists have tried to find virtualy in vein in these years.

I must congratulate Dr.M.Sasa for his continuous, laborious and yet unique and original achievements in the field of biological and environmental disciplines,on the occasion of the publication of this report, which is, however, only a part of his whole most excellent and admirable scientific carriers.

Keiichiro FUWA
Director of the National Institute
for Environmental Studies

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CONTENTS

Chironomidae of Japan: Checklist of Species Recorded, Key to Males and Taxonomic Notes

Manabu SASA[1]

SUMMARY

The present report comprises a checklist of the species of Chironomidae (Diptera) recorded from Japan and East Asia (including Taiwan, Korea and Sakhalin) as of December 1988, a provisional key to males of these species, taxonomic notes on some chironomid species recently collected in Japan, references, and index of individual species and higher taxa.

The oldest records of the chironomid species from this region was made by Kieffer, 12 species (all new species) from Taiwan in 1912, 35 species (including 24 new species) from Taiwan in 1916, and 5 species (all new) from the Philippines and 27 species (including 17 new and 2 unrecorded species) from Taiwan. However, most of his descriptions or figures were unfortunately inadequate in order to judge to which of the presently recognized species they correspond, and are excluded from the present list excepting those species which have been adequately redescribed by later authors.

The chironomid midges of this and the Micronesian Regions were studied and described extensively by Tokunaga from 1933 to 1965, and according to the check list compiled by Sasa & Yamamoto (1977), a total of some 160 species had already been recorded from the present territory of Japan. However, when we started our comprehensive studies on the taxonomy, distribution and ecology of this group of insects in 1976, it was soon recognized that there still occurred considerable numbers of new or unrecorded chironomid species in this region under various different ecological niches. Contributions to the chironomid fauna of this region were made also by Drs. H. Hashimoto, M. Yamamoto and others in Japan, Drs. H.I. Ree and H.S. Kim in Korea, and Dr, Yan Jing-song and others in China.

As the results, the total number of the chironomid species recorded so far from this region has reached to 480, among which 349 (72.7%) were described as species indigenous to Japan or East Asia, and the rest 131 (27.3%) were judged as common with other regions of the world. Of these species, 242 (50.4%) were recorded prior to 1966 mainly by Dr. M. Tokunaga, and the rest 238 (49.6%) were added by later workers. The numbers of articles referring to the taxonomy and distribution of the chironomid midges in Japan published by Sasa and coworkers during the last 10 year period from 1977 has reached to 37 including this paper, and to 1,367 pages in total. The number of species newly recorded by him and coworkers from this region is already over 200, among which 196 were described as new species.

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INTRODUCTION

The chironomid midges, or insects of the family Chironomidae, Order Diptera, includes large numbers of species whose larvae develop in almost all types of land waters and some also in the soil, and have been known to play an important role in the movements of nutrients along the food chain in nature. Their life cycle is usually very simple, the eggs layed by adult females hatch in water or in soil, the larvae feed usually on algae and detritus, and become pupae and then to adults. The male and the female copulate usually in the air, often forming swarms, and deposit eggs into the water or soil fitted for developments of larvae of each species. The adults do not take food excepting honey or sugar solution, and use the nutrients accumulated during the larval stage for the production of eggs, and thus do not cause damages on plants nor transmit diseases of man and animals, such as in the case of biting midges (Ceratopogonidae) or mosquitoes (Culicidae). This is the main reason that the chironomids have attracted little attention of entomologists in agricultural or medical fields. It should be noted that there exist a variety of exceptions in the above stated general accounts of the biology and ecology of this group of insects.

The present author started his studies in the taxonomy and ecology of the chironomid midges when he was appointed as a member of the newly founded National Institute for Environmental Studies (NIES) in Tsukuba in 1976. In a checklist of Chironomidae of Japan compiled by Sasa & Yamamoto (1977), a total of some 160 species of the family Chironomidae had been recorded, mainly by Dr. M. Tokunaga and his collaborators in Kyoto University. On the other hand, extensive studies were made by various authors on this group of insects in Europe and North America, and for example, a total of 448 species of Chironomidae were recorded in the checklist of British insects compiled by Kloet & Hinks (1975). Because the numbers of species of certain groups of animals found in Japan are usually several times or more than ten times larger than those found in the British Isles, it was expected that large numbers of chironomid species were still left unrecorded from this country.

My studies on the chironomid fauna of Japan were initiated at NIES collaborated by Dr. M. Yasuno and other members. Extensive surveys of the chironomids breeding in lakes and rivers in various districts of Japan were carried out during the last 10 years, as shown in the attached list of references. As the results, a total of some 480 species have so far been recorded and described from Japan and the neighboring regions, as shown in the following checklist. However, this list is obviously a provisional one and much more species are expected to be recorded in near future.

MATERIALS AND METHODS

Methods of collection, preservation and examination of specimens:

The collection of specimens was made mainly by two different methods, (1) the collection of adult midges with insect nets or sucking tubes from their resting places, or while swarming in the air. (2) the collection of immature stages together with bottom sediments or water grasses, and recovery of adults and pupal exuviae by laboratory rearing. The materials containing immature stages were brought into the laboratory in plastic bags, transferred to plastic containers 30 cm in

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diameter and 15 cm high, to which water was added to a depth of about 5 cm, air bubbles were introduced with an air pump, and each container was covered with nylon sheets fixed with a rubber ring. The adult midges emerged from the bottom samples were collected with a sucking tube, and pupal or larval exuviae were picked up with forceps from surface of water in the containers.

The adult specimens were usually preserved dry in small Petri dishes, and were kept frozen in a refrigerator, or at room temperature together with paradichlor benzene. They were then examined under a stereomicroscope and were mostly identified after mounted on slides. The wings were cut with fine forceps by leaving the squama together with the thorax, and were mounted dry under a special coverglass 24 mm long and 8 mm wide, fixed on a slide with manicure paste. The body was then treated for several minutes in hot 10% potassium hydroxide solution, washed in water, and dissected in a drop of gum-chloral solution with fine needles. The head was cut off from thorax, and both antennae are separated from head. The scutum and scutellum were separated from thorax. The abdomen was placed with dorsal side up. The gum-chloral solution was prepared by dissolving in hot bath 8 g of arabic gum powder and 30 g of chloral-hydrate in a mixture of 8 ml of water, 1 ml of acetic acid glacial, and 3 ml of glycerin. Coverglasses of 18 mm square were usually used for mounting the adult specimens in gum-chloral solution on slides.

The larvae and pupae collected from water or soil were preserved either in 70% ethanol or 1% formaldehyde solution. They were also digested in hot 10% potassium hydrochloride solution, dissected under stereomicroscope and mounted usually in gum-chloral solution. Exuviae of pupae and larvae were washed in water and dissected in gum-chloral solution without treatment with alkali. Because thoracic horns of some Chironominae (especially those of *Polypedilum*) become invisible in gum-chloral solution, they needed to be examined in water before mounting.

Glossary of terminology used in adult male morphology

The terminology used by the author for the morphology of adult males of Chironomidae largely followed the system proposed by Saether (1980), but some of the names used by Tokunaga (1933-1964) for the Japanese chironomids and also by the present author prior to this paper were retained (such as dorsal or ventral appendages, in place of Saether's superior or inferior volcella). These are partly shown in Figs. 1-15, Plate A, with the following abbreviations.

The body of adult male chironomids are composed of head, thorax and abdomen. The head has a pair of eyes (Eye), a pair of antenna (Atn), a pair of maxillary palp (Plp) composed usually of 4 flagellar segments, complicated mouth parts, and a pair of frontal tubercles in certain Chironominae species. The eyes may be bare, or pubescent, and with or without dorsomedian projection and thus ER (eye ratio) is an important character for separating the species groups. The antenna is composed of a basal segment (scape), a dounut-like pedicel (Pdc), and most frequently 11 or 13 flagellar segments (reduced in certain species), among which the last segment is usually much longer than the preceding very short segments (in Tanypodinae, the long last segment has a short terminal segment). The numbers of supraorbital setae (SO) and clypeal setae (CL) are sometimes characteristic to each species.

The thorax is composed of antepronotum (Atn), scutum (Sct, or mesonotum),

scutellum (Scl), and postontum ((Psn), and bears a pair of wings, halteres (Hlt), and 3 pairs of legs. The structure of antepronotum is often very important in classifying the chironomids, such as united in the middle or widelly separated, or with or without lateral setae, according to the species. The scutum usually has a pair of median and lateral stripes (scutal vitteae), dorsomedian (DMs), dorsolateral (DLs) and prealar setae (PAs), whose numbers differ according to the species. Scutum sometimes has a median tubercle characteristic to genus *Stictochironomus*, Mesonotalhoecker of Brundin (1956) characteristic to genus *Pseudosmittiia*, or large humeral pits seen in *Rheocricotopus*, species.

The structure of wing is as shown in Fig. 4 and 5. The presence or absence of the cross vein m-cu is a useful character in separating subfamilies of Chironomidae, and the structure of other wing veins are usually very important in identifying genera and species. The squama is either bare or fringed with hairs, wing membrane is either with macrotrichiae or bare, or either smooth or granular, according to the groups.

The three pairs of legs are each composed of coxa, trochanter, femur, tibia, and 5 tarsal segments (Fig.1). The terminal structure of each tibia is characteristic to the subfamilies, tribes, and genera (Figs.6-8). The ratio of tarsus I to tibia of each leg, LR, as well as the relative length of the longest hairs of tarsi I to the width of the segment expressed as BR, is useful in identification. The terminal structure of legs, especially the presence or absence of pulvilli, is an important character in identifying the species groups (Fig.9).

Hypopygium of male chironomids is most important in the identification of groups and species. The ninth tergite has a variety of setae or processes characterictis to the species or species groups, and especially important is the presence or absence of anal point, and its structure. The bands of ninth tergite (B9t, Fig.13) are united in the middle or separated, a useful character for identification of some *Tanytarsus* species. Gonocoxite (Gcx) has a variety of appendages according to the species groups, such as dorsal, ventral and median appendages in Tanytarsini and some Chironomini species, or inner lobes of Orthocladiinae species. Gonostylus (Gst) shows a variety of differentiations according to the species and species groups.

The followings are technical terms and their abbreviations used in this and the previous reports of the author.

Abt: abdominal tergites I to IX, Fig. 1.. **aLW:** anal lobe of wing, Figs. 4 and 5. **Apn:** antepronotum, Fig.1. **aPt:** Anal point, Figs 10, 13. **Arc:** arculus, a sclerite at the base of wing, from which the wing length is measured (Figs 4, 5). **Clp:** clypeus, Fig.2. **Clw:** claw, Fig. 9. **Cst:** costa of wing (Figs 4, 5). **Cul, Cu2:** wing veins, Fig.4. **Cx:** coxa, the basal segment of legs, Fig.1. **dAp:** dorsal appendage of hypopygium, Figs. 10, 13. **Dig**.: digitus, Figs 13, 14. **DLs:** dorsolateral setae of scutum, Fig.1. **DMs:** dorsomedian setae of scutum, Fig.1. **fCu:** fork of cubital vein into Cul and Cu2, Figs.1, 4. **Fe:** femur, Fig.1. **fPe:** front leg. **fTb:** frontal tubercle on frons of head. **Gcx:** gonocoxite of hypopygium, Figs.10, 13. **Gst:** gonostylus of hypopygium, Figs.10, 13. **Hlt:** halteres, Fig.1. **hPe:** hind leg. **hPt:** humeral pit, pale area in humeral area of scutum in genus *Rheocricotopus*. **Hyp:** hypopygium, Figs.10 and 13. **iLb:** inner lobe of gonocoxite seen in Orthocladiinae. **lVt:** lateral vitteae, or lateral stripes on scutum. **M:** wing vein M, Fig.4. **Mat:** macrotrichiae on wing, Fig.5. **m-cu:** cross vein connecting M and Cu, Fig.5. **Mit:** microtrichiae on body and wing surface. **mPe:** middle leg. **Msn:** mesonotum or scutum. **mVt:** median vittteae, or

median stripes on scutum, Fig.1. **9Tg:** ninth abdominal tergite or anal tergite, IX in Fig.1. **PAs:** prealar setae on scutum, Fig.1. **Pdc:** pedicel, or the second, large globose segment of antenna, Fig.2. **Plp:** maxillary palp, Fig.2. **Plv:** pulvilli on the tip of tarsus V, Fig.9. **PNs:** setae on antepronotum, Fig.3. **Psn:** postnotum, Fig.1. **R1, R2+3, R4+5:** wing veins, Fig.4. **r-m:** cross vein connecting R and M, Figs.4, 5. **Scl:** scutellum, Fig.1. **Sct:** scutum, Fig.1. **SOs:** supraorbital setae, Fig.2. **Sq:** squama, basalmost lobe of wing, with or without fringe hairs, Figs.4, 5. **Ta:** tarsal segment of leg, I to V, Fig.1. **Ti:** tibia, Fig.1. **tiSc:** tibial scale, Figs. 7, 8. **tiSp:** tibial spur, Fig. 6. **Tr:** trochanter, Fig.1. **vAp:** ventral appendage, or inferior volcella, Figs.10, 12, 13. **Vrg:** virga, spine group attached between bases of gonocoxite. **Wing:** Figs.4, 5.

Explanation of Plate A. Fig.1: whole body of adult male, *Cryptochironomus albofasciatus*. **Fig.2:** head, *Trissopelopia oyabetrispinosa*. **Fig.3:** antepronotum, *T.o.*. **Fig.4:** wing, *C.a.* **Fig.5:** wing, *T.o.* **Fig.6:** tip of front tibia, *Tanytarsus* sp. "kamogawa." **Fig.7:** tip of middle tibia, *T.* sp. **Fig.8:** tip of hind tibia, *T.* sp. **Fig.9:** hind tarsus *V*, *T.* sp. **Fig.10:** hypopygium, *Polypedilum* sp. "Okiharaki." **Fig.11:** dorsal appendage, *P.* sp. **Fig.12:** ventral appendage, *P.* sp. **Fig.13:** hypopygium, *T.* sp. **Fig. 14:** dorsal appendage and digitus, *T.* sp. **Fig.15:** median and ventral appendages, *T.* sp.

Methods of standard measurements of adult specimens:

The methods of standard measurements of various organs and their abbreviations are as follows.

BL: Body length, or the combined length in mm of thorax and abdomen in slide-mounted specimens. **WL:** wing length, or the distance between tip of wing and arculus. **AR:** antennal ratio, obtained by dividing the length of last antennal segment (in Tanypodinae, combined length of the last and the long penultimate segment) with the combined length of the remaining flagellar segments (not including pedicel). **AHR:** antennal hair ratio, obtained by dividing the length of longest hairs on the penultimate segment with the combined length of flagellar segments of antenna. **ER:** eye ratio, obtained by dividing the distance between dorso-medial corners of two eyes with the height of an eye. **SO:** number of supraorbital setae on one side. **CL:** number of clypeal setae. **PN:** number of setae on antepronotum of each side. **DM:** number of dorsomedian setae on scutum. **DL:** number of dorsolateral setae on each side of scutum. **PA:** number of pre-alar setae on each side of scutum. **SC:** number of setae on scutellum. **RR:** radius ratio, obtained by dividing the distance between the tips of R1 and R2+3 with the distance between tips of R1 and R4+5; when R2+3 ends at midway between tips of R1 and R4+5, the value becomes 0.5, but becomes near 1.0 when R2+3 is almost fused with R4+5. **VR:** venarum ratio, obtained by dividing the distance between tip of arculus and fCu with the distance between tip of arculus and r-m. **R/Cu:** radius/cubitus ratio, obtained by dividing the horizontal distance between arcus and tip of R4+5 with horizontal distance between arcus and tip of Cu1; it is 1.0 when tip of R4+5 is on the same level as tip of Cu1, while it is less than 1.0 when R4+5 ends proximal to tip of Cu1; **fLR:** front leg ratio, obtained by dividing the length of front tarsus I with the length of front tibia. **mLR:** ratio obtained by dividing the length of middle tarsus I with the length of middle tibia. **hLR:** ratio obtained by dividing the length of hind tarsus I with the length of hind tibia. **fTR:** ratio obtained by dividing the length of front tarsus V with the length of front tibia. **fBR:** front beard ratio,

obtained by dividing the length of longest hair on front tarsus I with the diameter of the segment at the site of the base of the hair. **mBR, hBR:** same, referring to the beard ratio of middle and hind tarsus I.

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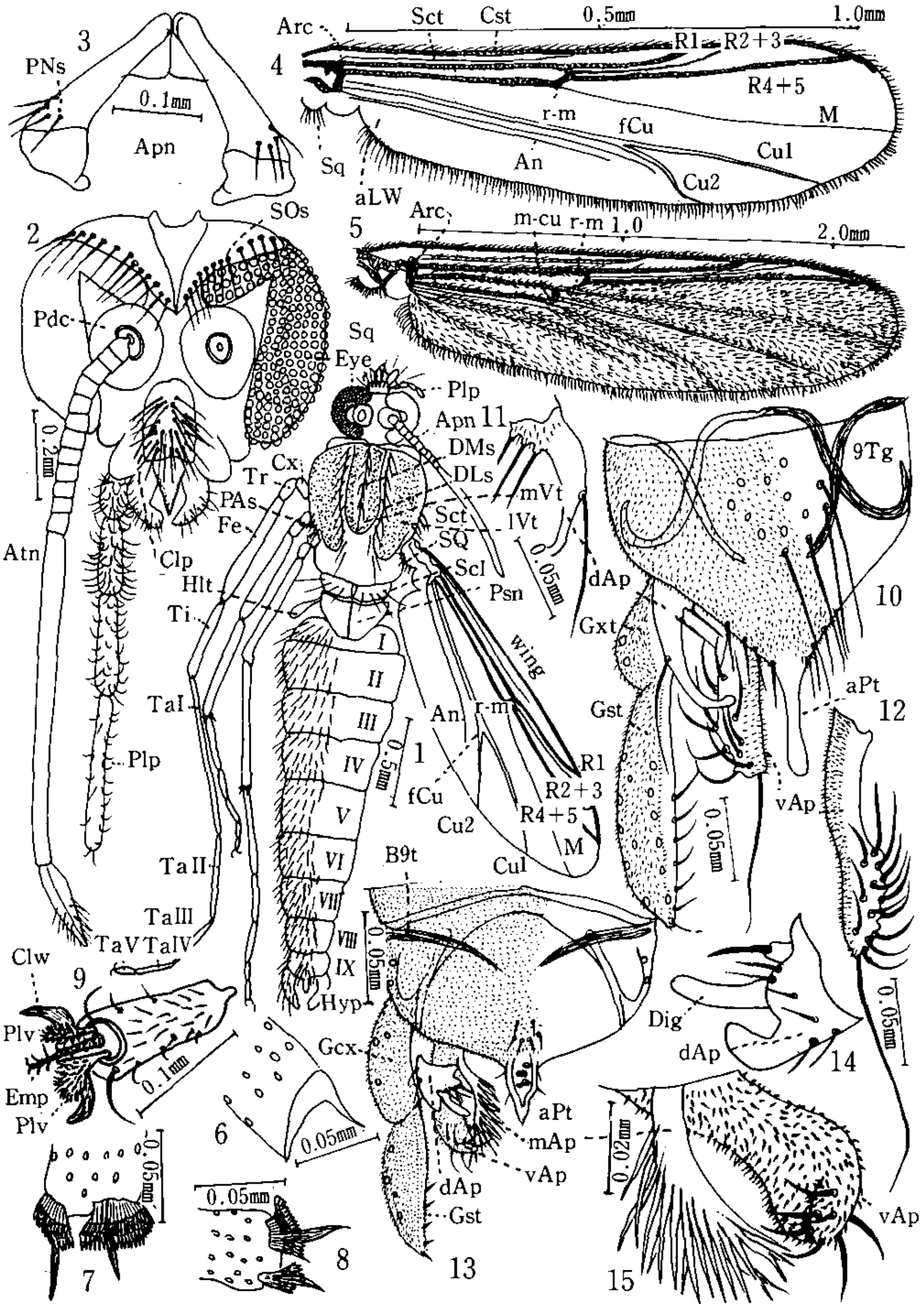


Plate A. Glossary of terminology used in adult male morphology

Part 1. Checklist of Chironomidae Recorded from Japan and East Asia

This list was prepared by assistance of Dr. Ryo Arakawa, Department of Parasitology, Toyama Medical and Pharmaceutical Univerisity. This list includes the chironomid species recorded from Japan and East Asia (Sakhalin, Korea, East China and Taiwan), but the species recorded only by Kieffer (1912, 1916, 1921, 1922) from Taiwan are not quoted excepting those recognized and redescribed by later authors, because his description and illustrations are very poor and cannot be quoted as valid species unless his type specimens could be examined and redescribed.

I. LIST OF SUBFAMILIES, TRIBES AND GENERA

A. Subfamily CHIRONOMINAE

AA. Tribe CHIRONOMINI

AA(A). The ***Chironomus*** complex

1 . Genus ***Camptochironomus*** Kieffer, 1918
2 . Genus ***Carteronica*** Strand, 1928
3 . Genus ***Chaetolabis*** Townes, 1945
4 . Genus ***Chironomus*** Meigen, 1803
5 . Genus ***Dicrotendipes*** Kieffer, 1913
6 . Genus ***Einfeldia*** Kieffer, 1924
7 . Genus ***Glyptotendipes*** Kieffer, 1913
    (1) Subgenus ***Glyptotendipes*** s. str.
    (2) Subgenus ***Phytotendipes*** Goetghebuer, 1937
8 . Genus ***Kiefferulus*** Goetghebuer, 1922
9 . Genus ***Nilodorum*** Kieffer, 1921

AA(B). The ***Harnischia*** complex

1 . Genus ***Cladopelma*** Kieffer, 1921
2 . Genus ***Cryptochironomus*** Kieffer, 1918
3 . Genus ***Cryptotendipes*** Lenz, 1941
4 . Genus ***Demicryptochironomus*** Lenz, 1941
5 . Genus ***Harnischia*** Kieffer, 1921
6 . Genus ***Microchironomus*** Kieffer, 1918
7 . Genus ***Parachironomus*** Lenz, 1921
8 . Genus ***Paracladopelma*** Harnisch, 1923

AA(C). The ***Polypedilum*** complex

1 . Genus ***Ainuyusurika*** Sasa et Shirasaka, 1988
2 . Genus ***Endochironomus*** Kieffer, 1918
3 . Genus ***Microtendipes*** Kieffer, 1915
4 . Genus ***Nilothauma*** Kieffer, 1921
5 . Genus ***Paratendipes*** Kieffer, 1911

6 . Genus ***Pentapedilum*** Kieffer, 1913
7 . Genus ***Phaenopsectra*** Kieffer, 1921
8 . Genus ***Polypedilum*** Kieffer, 1913
  (1) the *nubifer* group
  (2) the *nubeculosum* group
  (3) the *Tripodura* group
  (4) the *cultellatum* group
9 . Genus ***Stenochironomus*** Kieffer, 1919
10. Genus ***Stictochironomus*** Kieffer, 1919

AB. Tribe TANYTARSINI

1 . Genus ***Biwatendipes*** Tokunaga, 1965
2 . Genus ***Cladotanytarsus*** Kieffer, 1922
3 . Genus ***Micropsectra*** Kieffer, 1911
4 . Genus ***Neozavrelia*** Goetghebuer, 1941
5 . Genus ***Paratanytarsus*** Bause, 1913
6 . Genus ***Pontomyia*** Edwards, 1926
7 . Genus ***Rheotanytarsus*** Bause, 1914
8 . Genus ***Stempellina*** Bause, 1913
9 . Genus ***Tanytarsus*** van der Wulp, 1893
  (1) The *boodleae* group
  (2) The *kirai* group
  (3) The *usmaensis* group
  (4) The *oyamai* group
  (5) The *mendax* group
  (6) The *yunosecundus* group
10. Genus ***Yuasaiella*** Tokunaga, 1938
11. Genus ***Zavrelia*** Kieffer, 1920

B. Subfamily ORTHOCLADIINAE

BA. Tribe ORTHOCLADIINI

BA(A). The ***Brillia*** complex

1 . Genus ***Brillia*** Kieffer, 1913
2 . Genus ***Diplocladius*** Kieffer, 1908
3 . Genus ***Tokunagayusurika*** Sasa, 1978

BA(B). The ***Chasmatonotus*** complex

1 . Genus ***Chasmatonotus*** Loew, 1864

BA(C). The ***Cricotopus*** complex

1 . Genus ***Cricotopus*** van der Wulp, 1874
  (1) Subgenus ***Cricotopus***, s. str.
  (2) Subgenus ***Isocladius*** Kieffer, 1909

(3) Subgenus ***Pseudocricotopus*** Nishida, 1987
2 . Genus ***Nanocladius*** Kieffer, 1913
3 . Genus ***Paracladius*** Hirvenoja, 1973
4 . Genus ***Paratrichocladius*** Santos Abreu, 1918
5 . Genus ***Rheocricotopus*** Thienemann et Harnisch, 1932

BA(D). The ***Orthocladius*** complex
1 . Genus ***Cardiocladius*** Kieffer, 1912
2 . Genus ***Eukiefferiella*** Thienemann, 1926
3 . Genus ***Heterotrissocladius*** Spärck, 1923
4 . Genus ***Orthocladius*** van der Wulp, 1873
(1) Subgenus ***Euorthocladius*** Thienemann, 1935
(2) Subgenus ***Orthocladius,*** s. str.
5 . Genus ***Psectrocladius*** Kieffer, 1906
(1) Subgenus ***Monopsectrocladius*** Wuelker, 1956
(2) Subgenus ***Psectrocladius***, s. str.
6 . Genus ***Synorthocladius*** Thienemann, 1935
7 . Genus ***Tokunagaia*** Saether, 1973

BB. Tribe METRIOCNEMINI

1 . Genus ***Chaetocladius*** Kieffer, 1911
2 . Genus ***Heleniella*** Gowin, 1943
3 . Genus ***Limnophyes*** Eaton, 1875
4 . Genus ***Metriocnemus*** van der Wulp, 1874
5 . Genus ***Okayamayusurika*** Sasa, gen. nov.
6 . Genus ***Okinawayusurika*** Sasa et Hasegawa, 1988
7 . Genus ***Parachaetocladius*** Wuelker, 1959
8 . Genus ***Parakiefferiella*** Thienemann, 1936
9 . Genus ***Parametriocnemus*** Goetghebuer, 1923
10. Genus ***Paraphaenocladius*** Spärck et Thienemann, 1926
11. Genus ***Pseudorthocladius*** Goetghebuer, 1932
12. Genus ***Pseudosmittia*** Goetghebuer, 1932
13. Genus ***Smittia*** Holmgren, 1869
14. Genus ***Toyamayusurika*** Sasa et Kawai, 1987
15. Genus ***Trissocladius*** Kieffer, 1908
16. Genus ***Tsudayusurika*** Sasa, 1985

BC. Tribe CORYNONEURINI

1 . Genus ***Corynoneura*** Winnertz, 1846
2 . Genus ***Thienemanniella*** Kieffer, 1911

BD. Tribe CLUNIONINI

1 . Genus ***Clunio*** Haliday, 1855
2 . Genus ***Telmatogeton*** Schiner, 1866

3 . Genus ***Thalassomyia*** Schiner, 1856

C. Subfamily DIAMESINAE

CA. Tribe DIAMESINI

1 . Genus ***Diamesa*** Meigen, 1838
2 . Genus ***Heptagyia*** Philippi, 1865
3 . Genus ***Potthastia*** Kieffer, 1922
4 . Genus ***Pseudodiamesa*** Goetghebuer, 1939
5 . Genus ***Syndiamesa*** Kieffer, 1918

CB. Tribe PRODIAMESINI

1 . Genus ***Monodiamesa*** Kieffer, 1921
2 . Genus ***Prodiamesa*** Kieffer, 1911

D. Subfamily TANYPODINAE

DA. Tribe COELOTANYPODINI

1 . Genus ***Clinotanypus*** Kieffer, 1913

DB. Tribe MACROPELOPIINI

1 . Genus ***Apsectrotanypus*** Fittkau, 1962
2 . Genus ***Macropelopia*** Thienemann, 1916
3 . Genus ***Procladius*** Skuse, 1887
4 . Genus ***Psectrotanypus*** Kieffer, 1909

DC. Tribe PENTANEURINI

1 . Genus ***Ablabesmyia*** Johannsen, 1905
2 . Genus ***Conchapelopia*** Fittkau, 1957
3 . Genus ***Krenopelopia*** Fittkau, 1962
4 . Genus ***Nilotanypus*** Kieffer, 1923
5 . Genus ***Paramerina*** Fittkau, 1962
6 . Genus ***Rheopelopia*** Fittkau, 1962
7 . Genus ***Trissopelopia*** Kieffer, 1923
8 . Genus ***Zavrelimyia*** Fittkau, 1962
9 . Unplaced species of tribe **PENTANEURINI**

DD. Tribe TANYPODINI

1 . Genus ***Tanypus*** Meigen, 1803

II. LIST OF GENERA AND SPECIES

The following list of each species shows the scientific name, reference of the original description, and the generic name originally used (if other name was used). When additional records are made for the respective species, these are quoted by the order of the author, year, page, the stages described (M: male, F: female, P: pupa, L: larva), the type locality (=type loc.) and other collection sites (when the station number is used, it is abbreviated as St.).

A. Subfamily CHIRONOMINAE

AA. Tribe CHIRONOMINI

AA(A). The *Chironomus* complex

1. Genus *Camptochironomus* Kieffer, 1918

biwaprimus Sasa & Kawai, 1987: Lake Biwa Stud. Monogr., **3**,12; M.F.P.; type loc. Otsu City, on the shore of Lake Biwa (Shiga)
Sasa (1988),p.13; M.; Lake Toya

2. Genus *Carteronica* Strand, 1928
(=*Carteria* Kieffer, 1921)

crassiforceps (Kieffer, 1916); *Tendipes*; Ann. Mus. Nat. Hung., **14**,111; M.; type loc. Tainan (Taiwan)
Sasa & Hasegawa (1983), p.314; No.2, *Chironomus* sp. (Ikema-yusurika); M.F.; Ikema Island (Okinawa)
Hasegawa & Sasa (1987), p.286; P.L. *Chironomus*

longilobus (Kieffer, 1916); Ann. Mus. Nat. Hung., **14**,107; *Tendipes;* M.; type loc. Takao (Taiwan)
Sasa & Hasegawa (1983), p.313; M.F.; collected from sea water fishpond at Chatan (Okinawa)
Hasegawa & Sasa (1987), p.277; P.L.; Okinawa Island (Okinawa)

3. Genus *Chaetolabis* Townes, 1945

macani (Freeman, 1948); Chironomus; Entomol. Monogr. Mag., **84**,49-50
Yamamoto (1987), p.149; M.F.; Hokkaido

4. Genus *Chironomus* Meigen, 1803

acerbiphilus Tokunaga, 1939; Philipp. J. Sci., **69**,336; M.F.; type loc. Katanuma (Miyagi)
Sasa (1978), p.10; M.F.P.L.; from the type locality
Sasa (1985b), p.28; M.F.P.L.; from a sulphuric stream of Volcano Kirishima

(Miyazaki)
Yamamoto (1986), p.324; M.F.P.L.; from the type locality

basitibialis Tokunaga, 1936; Philipp. J. Sci.,**60**,81; M.F.; type loc. Seto (Wakayama); possibly a synonym of *circumdatus* (Kieffer)

circumdatus (Kieffer, 1916); Ann. Mus. Nat. Hung.,**14**,110; *Tendipes*; type locality. Tainan (Taiwan)
Hashimoto (1977), p.83; M.
Sasa (1978), p.11; M.F.P.L.; NIES (Ibaraki)
Sasa (1983), p.4; Sts. D and H, River Tama (Tokyo)
Sasa & Hasegawa (1983), p.316; Okinawa and Miyako Islands (Okinawa)
Sasa & Kawai (1987a), p.10; Lake Biwa (Shiga)
Hasegawa & Sasa (1987), p.286; P.L.; Okinawa Island (Okinawa)
Sasa (1988c), p.56; Lake Kojima (Okayama)

* *dorsalis* Meigen, 1818; various authors from Japan before 1972; =*yoshimatsui* Martin et Sublette, 1972

enteromorphae Tokunaga, 1936; transferred to *Dicrotendipes*

enteromorphae pacificus Tokunaga, 1936; transferred to *Dicrotendipes*

* *flaviplumus* Tokunaga, 1940; Philipp. J. Sci., **72**,294; M.; type loc. Saga (Kyoto); synonym of *samoensis* Edwards, 1926

fujiprimus Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,104; M.F.; type loc. Lake Shoji (Yamanashi)
Sasa & Kawai (1987a), p.10; Lake Biwa (Shiga)

fujisecundus Sasa, 1985; transferred to genus *Glyptotendipes*

fujitertius Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,106; M.; type loc. Lake Kawaguchi (Yamanashi); also from Lake Motosu (Yamanashi)
Sasa & Kamimura (1987), p.15; M.; Lake Kussharo (Hokkaido)

javanus (Kieffer, 1924); *Tendipes;* Ann. Soc. Sci. Brux., **43**,263
Sasa & Hasegawa (1983), p.317; M.F.; emerged from sewage ditches at Tamagusuku and Maekawa (Okinawa)
Hashimoto (1984), p.24; M.F.P.L.; Shizuoka-shi (Shizuoka)
Sasa & Kikuchi (1986), p.18; collected by light traps in Tokushima
Hasegawa & Sasa (1987), p.281; P.L.; Okinawa

kiiensis Tokunaga, 1936; Philipp. J. Sci.,**60**,77; M.F.; type loc. Seto (Wakayama)

Hashimoto (1977), p.83; M.;
Sasa (1978), p.15; M.F.P.L.; from concrete pools in NIES (Ibaraki)
Sasa (1980), p.39; River Minamiasakawa (Tokyo)
Sasa & Kikuchi (1986), p.18; Tokushima-shi (Tokushima)
Sasa & Kawai (1986a), p.11; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.29; River Itachi (Toyama)
Hasegawa & Sasa (1987), p.287; P.L.

lugubris Zetterstedt, 1850; Dipt. Sci.,**9**,3490, 8; Europe
Tokunaga (1938a), p.323; M.F.P.; from hotspring water at Unzen (Nagasaki)

nippodorsalis Sasa, 1979; Jpn. J. Sanit. Zool., **30**,188; new name for *Chironomus strenzkei* Sasa, 1979, p.21
Sasa (1979b), p.21; as *Chironomus strenzkei*, n.sp.; M.F.P.L.; type loc. Yatabe and Hanamuro (Ibaraki)
Sasa & Kawai (1987a, p.11); Lake Biwa (Shiga)

nipponensis Tokunaga, 1940; Philipp. J. Sci., **72**,293; M.F.; type loc. Shikuka, (Sakhalin)
Hashimoto (1977a), p.83; M.
Hashimoto (1977b), p.81; L.
Sasa (1978b), p.16; M.F.P.L.; Lake Chuzenji (Tochigi), Yatabe and Tsuchiura (Ibaraki)
Sasa (1984), p.43; Lake Yunoko (Tochigi)
Sasa (1985a), p.4; M.; Lake Utonai (Hokkaido)
Sasa (1985b), p.30; Lake Unagi (Kagoshima) and Lake Kagami (Miyazaki)
Sasa (1985c), p.104; Lake Yamanaka (Yamanashi)
Sasa & Kamimura (1987), p.13; M.; Lake Akan (Hokkaido); the light and the dark forms
Sasa & Kawai (1987a), p.11; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.29; River Itachi (Toyama)
Sasa (1988b), p.79; from lakes in Abashiri (Hokkaido)

okinawanus Hasegawa et Sasa, 1987; Jpn. J. Sanit. Zool.,**38**,283; new name for *Chironomus* sp. "Okinawayusurika" of Sasa & Hasegawa, 1983, p.316
Sasa & Hasegawa (1983), p.316; No.7, *Chironomus* sp. Okinawa-yusurika; M.F.; from sewage ditches and eutrophicated ponds on Okinawa and Ishigaki Islands (Okinawa)
Hasegawa & Sasa (1987), p.283; P.L.; Okinawa

plumosus (Linnaeus, 1758); *Tipula*; Syst. Nat. Ed., **10**,587, 19; Europe
Esaki (1932), p.164; M.F.
Esaki (1950), p.1564; *plumosus prasinus* Meigen; M.F.
Yamagishi & Fukuhara (1971), p.309; biology in Lake Suwa (Nagano)
Hashimoto (1977a), p.83; M.
Hashimoto (1977b), p.80; L.

Sasa (1978), p.18; M.F.P.L.; Lake Kasumigaura (Ibaraki)
Yasuno et al. (1979), p.171; biology in Lake Kasumigaura (Ibaraki)
Iwakuma & Yasuno (1981), p.171; biology in Lake Kasumigaura (Ibaraki)
Sasa (1985c), p.103; Lake Ashinoko (Kanagawa) and Lake Shoji (Yamanashi)
Sasa & Kamimura (1987), p.13; M. Lake Akan (Hokkaido)
Sasa & Kawai (1987), p.11; Lake Biwa (Shiga)
Sasa et al. (1988), Lake Shikotsu and Utonai (Hokkaido)

prassinellus (Kieffer,1912); *Tendipes*; Suppl. Entomol.(Deut.Entomol. Mus.); M.F.; Taiwan
Tokunaga (1940), p.292; M.F.; Taihoku (Taiwan)

riparius (Meigen, 1804); Klass. Beschr. eur. Zweifl. Ins., I,13; Europe
Tokunaga (1940), p.291; *Chironomus thumini* (missprint of *thummi*) Kieffer; M.L.; from hotspring at Zigoku-onsen (Kumamoto); this was regarded as *Chironomus riparius* Meigen by Martin & Sublette (1972), p.6
Sasa & Kamimura (1987), p.15; M.; Lake Akan (Hokkaido)

salinarius Kieffer, 1921
Sasa (1978a), p.20; M.F.L.P.; from brackish swamp at Tokushima (Tokushima)
Sasa & Kikuchi (1986) p.18; rice paddy in Tokushima

samoensis Edwards, 1928; Insects of Samoa, **6**(2),67; type loc. Samoa
Tokunaga (1940), p.294; *Chironomus flaviplumus;* M.; type loc. Saga (Kyoto); regarded as a synonym of samoensis
Hashimoto (1977a), p.82; M.F.
Hashimoto (1977b), p.79; L.
Sasa (1978b), p.12; *flaviplumus;* M.F.L.P.; Yatabe (Ibaraki) and Tokyo
Sasa & Hasegawa (1983), p.316; Okinawa, Miyako, Ikema and Ishigaki slands (Okinawa)
Yamamoto (1983), p.15; *flaviplumus;* morphological differences between *flaviplumus* and *yoshimatsui*
Yamamoto (1984), p.23; intersexuality of *flaviplumus*
Sasa (1985b), p.30; Lake Unagi (Kagoshima)
Sasa & Kawai (1987), p.12; Lake Biwa (Shiga)
Hasegawa & Sasa (1987), p.284; P.; Okinawa

setonis Tokunaga, 1936; Philipp. J. Sci., **60**,78; M.F.P.; type loc. Shirahama (Wakayama); collected from tide pools

* *strenzkei* Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud.,**3**, p.21(new name, *nippodorsalis*, was given by Sasa, 1979a, p.188, because this name was preoccupied by Fittkau (1968) for an Amazonian species.

trinigrivittatus Tokunaga, 1940; Philipp. J. Sci., **72**,294; M.F.; type loc. Shikuka

(Sakhalin)
Hashimoto (1982), p.367; M.; Ozegahara (Tochigi)

yoshimatsui Martin et Sublette, 1972; Stud. Nat. Sci.,**1**(3), 1; M.F.P.L.; type loc. Yamaguchi; a new name for C. dorsalis of various authors from Japan
Esaki (1932), p.164; *C. dorsalis* Meigen; M.F.
Esaki (1950), p.1564; *C. dorsalis Meigen; M.F.*
Taki (1932), p.66; *C. dorsalis* Meigen; description of eggs
Tokunaga (1959), p.644; *Tendipes dorsalis* (Meigen); P.L.
Shirota (1969), pp.1-148; *C. dorsalis;* biology
Martin & Sublett (1972), pp.1-58; description as a new species
Hashimoto (1977a), p.82; M.
Hashimoto (1977b), p.79; L.
Sasa (1978b), p.23; M.F.P.L.; Tsuchiura (Ibaraki)
Sasa (1984), p.43; Lake Yunoko (Tochigi)
Sasa (1985a), p.3; Sapporo (Hokkaido)
Sasa (1985b), p.30; Lake Ikeda (Kagoshima)
Sasa (1985c), p.104; Lake Ashinoko (Kanagawa), Lake Kawaguchi and Shoji (Yamanashi)
Sasa & Kamimura (1987), p.13; Lake Akan (Hokkaido)
Sasa & Kawai (1987a), p.12; Sts. W-4 and 10, Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.29; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.28; River Oyabe (Toyama)

5. Genus ***Dicrotendipes*** Kieffer, 1913
(=*Limnochironomus* Kieffer, 1923; =*Kimius* Ree, 1981)

enteromorphae (Tokunaga, 1936); Philipp. J. Sci.,**60**,71; *Chironomus;* M.F.P.L.; type loc. Seto (Wakayama); collected from tide pools

enteromorphae pacificus (Tokunaga, 1936); Philipp. J. Sci., **60**,76; *Chironomus;* M.; type loc. Seto (Wakayama); collected from tide pools

Note: The above two species are transferred from *Chironomus* since the structure of dorsal appendages are characteristic to this genus.

flexus (Johannsen, 1932); *Chironomus* (*Limnochironomus*); Arch. Hydrobiol. Suppl., **11**,530
Sasa (1985b), p.33; M.F.; Lake Unagi (Kagoshima)
Sasa (1985c), p.113; M.; Lake Shoji (Yamanashi)

* *formosanus* Kieffer, 1916; Ann. Mus. Nat. Hung., **14**,115; type loc. Tainan (Taiwan); designated as a synonym of *septemmaculatus* Becker by Epler (1988, p.42)

inouei Hashimoto, 1984; Bull. Fac. Educ. Shizuoka Univ. Nat. Sci., **35**,46; M.F.; type loc. Kanita, Hamamatsu (Shizuoka); from brackish water

lobiger (Kieffer, 1921); *Limnochironomus;* Bull. Soc. Hist. Nat. Moselle, **29**,71; Europe

Tokunaga (1940), p.300; *Chironomus* (*Limnochironomus*); M.F.; Sikuka (Sakhalin)

Sasa (1984), p.43; M.F.P.L.; Lake Yunoko (Tochigi)

Sasa (unpublished) collected from Lake Hiroshima-jo (Hiroshima), 15 June 1981 and 19 April 1985

Sasa (1988b), p.79; M.F.; Lake Kutcharo (Hokkaido)

nervosus (Staeger, 1839); *Chironomus;* Naturh. Tidskr., **2**,567; Europe

Sasa & Kikuchi (1986), p.19; M.F.; from a rice paddy area in Tokushima; light trap collection

Sasa & Kawai (1987a), p.14; Lake Biwa (Shiga)

* *niveicaudus* (Kieffer, 1921); *Limnochironomus*; Philipp. J. Sci.,**18**,585; from Luzon, Laguna and Los Banos (Philippines); designated as a synonym of *pelochloris* Kieffer, 1912, by Epler, 1988, p.134

pelochloris (Kieffer, 1912); *Tendipes*; Sauter's Formosa-Ausbeute, Suppl. Entomol., **1**,39

Ree (1981), p.218; *Kimius hoonsooi,* gen. et sp. nov.; Korea

Sasa & Hasegawa (1983), p.321; *Dicrotendipes niveicaudus* (Kieffer); M.F.; Okinawa, Ikema and Ishigaki Islands (Okinawa); from sewage ditches and eel ponds

Sasa (1985b), p.33; *D. niveicaudus;* Lake Ikeda (Kagoshima)

Sasa (1985c), p.114; *D. niveicaudus;* Lake Kawaguchi and Shoji (Yamanashi)

Sasa & Kawai (1987a), p.14; *D. niveicaudus;* Lake Biwa (Shiga)

Hasegawa & Sasa (1987), p.290; *D. niveicaudus;* P.L.; River Hija (Okinawa)

Sasa (1988c), p.56: *D. niveicaudus;* Lake Kojima (Okayama)

Epler (1988), p.134; redescription of *Tendipes pelochloris* Kieffer, and new synonymy

septemmaculatus Becker, 1908; Mitt. Zool. Mus. Berl., **4**,77; type loc. Canary Islands

Kieffer (1916), p.115; described as *Tendipes formosanus,* n. sp. from Tainan (Taiwan)

Sasa & Hasegawa (1983), p.320; *Dicrotendipes formosanus* Kieffer, 1916; M.F.; Ishigaki and Miyako Islands (Okinawa); collected from eel ponds

Epler (1988), p.42; designated *formosanus* Kieffer, 1916 and *formosanus* var. *frontalis* Kieffer, 1916 as synonyms of *septemmaculatus*

tamaviridis Sasa, 1981; Res. Rep. Natl.Inst.Environ.Stud.,**29**,99; M.P.; type loc. River Minami asakawa (Tokyo); from polluted stream at St. 4.

yaeyamanus Hasegawa et Sasa (1987); Jpn. J. Sanit. Zool.,**28**,287; new name

Sasa & Hasegawa (1983), p.320; No.12 *Dicrotendipes* sp. Yaeyamayusurika; M. F.; Ishigaki-shi (Okinawa); from filtration pond of water treatment plant

Hasegawa & Sasa (1987), p.287; P.L.; Ishigaki-shi (Okinawa)

6. Genus ***Einfeldia*** Kieffer, 1924

dissidens (Walker, 1851); *Chironomus*; Ins. Brit.,**3**,154
Tokunaga (1940); *Chironomus* (*Chironomus*)*dystenus* Kieffer; Taihoku (Taiwan)
Sasa & Hasegawa (1983), p.318; M.F.; Ishigaki Island (Okinawa)
Sasa (1985b), p.30; M.F.P.L.; Lake Ikeda (Kagoshima)
Sasa & Kikuchi (1986), p.18; Tokushima (Tokushima)
Sasa & Kawai (1987a), p.14; Lake Biwa (Shiga)
Sasa (1988c), p.56; Lake Kojima (Okayama)

dorsalis (Meigen, 1818); Syst. Beschr. Zweifl. Ins., **1**,25; *Chironomus;* type loc. Europe
Yamamoto (1982), p.302; *Einfeldia*; collection records from Hokkaido, Gifu, Aichi, Yamaguchi and Kagoshima

* *dystenus* (Kieffer, 1916); *Tendipes*; Ann. Mus. Nat. Hung.,**14**,112; type loc. Tainan (Taiwan); synonym of *dissidens* (Walker)

pagana (Meigen, 1838); Syst. Beschr. Zweifl. Ins.,**7**,7; *Chironomus*; type loc. Belgium
Yamamoto (1982), p.302; Einfeldia; collection record from Yamaguchi

7. Genus ***Glyptotendipes*** Kieffer, 1913

(1) Subgenus ***Glyptotendipes*** s. str.

biwasecundus Sasa et Kawai 1987; Lake Biwa Stud. Monogr.,**3**, p.14; M.; type loc. St. W-6, Lake Biwa (Shiga)

fujisecundus (Sasa, 1985); Chironomus; Res. Rep. Natl. Inst. Environ. Stud., **83**,105; M.F.; type loc. Lake Kawaguchi (Yamanashi); also at Lake Yamanaka (Yamanashi); new combination

goryoensis Ree et Kim, 1981; Proc. Coll. Nat. Sci. Seoul Nat. Univ.,**6**, 149; M.; Seoul (Korea)

(2) Subgenus ***Phytotendipes*** Goetghebuer, 1937

* *glaucus* (Meigen, 1818)
Tokunaga (1938b), p.324; possibly the same species as tokunagai Sasa, 1979

gripekoveni Kieffer, 1913; Bull. Soc. Hist. Nat. Metz.,**3**,22; Europe
Tokunaga (1940), p.298; M.F.; Saga (Kyoto)
Note: According to Townes (1945, p.142), *G. gripekoveni* Kieffer is a synonym

of *G. lobiger* (Say, 1823); J. Acad. Sci. Philadelphia,3,12

paripes (Edwards, 1929); *Chironomus* (*Glyptotendipes*); England
Tokunaga (1940), p.298; M.F.; Sikuka (Sakhalin)

tokunagai Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud., **7**, 8; M.F.P.L.; type loc. Yatabe (Ibaraki); also from Lake Kasumigaura (Ibaraki) and eel ponds at Yoshida (Shizuoka)
Tokunaga (1938b), p.324; recorded as *Chironomus* (*Glyptotendipes*) *glaucus* Meigen; M.F.P.; from stagnant water at Tomioka (Kumamoto)
Sasa & Hasegawa (1983), p.319; from eutrophicated ponds on Okinawa, Miyako and Ishigaki Islands (Okinawa)
Sasa (1985b), p.32; Lakes Unagi and Kagamiike (Kagoshima)
Sasa (1985c), p.108; Lakes Shoji, Kawaguchi and Yamanaka (Yamanashi)
Sasa & Kawai (1987a), p.16; Lake Biwa (Shiga)
Sasa (1988c), p.56; Lake Kojima (Okayama)

8. Genus ***Kiefferulus*** Goetghebuer, 1922

glauciventris (Kieffer, 1912); *Tendipes;* H. Sauter's Formosa Ausbeute, Suppl. Entomol. (Deut. Entomol. Mus.),1,40; type loc. Taiwan
Sasa & Hasegawa (1983), p.314; No.3, *Chironomus* sp.(Otsuru-yusurika); M.F.; Kochinda
Hasegawa & Sasa (1987), p.279; *Chironomus;* P.L.; Okinawa Island (Okinawa)

umbraticola (Yamamoto, 1979); *Chironomus* (*Kiefferulus*);Kontyu, **47**,8; M.F.P.L.; type loc: Mount Wakasugiyama (Fukuoka); collected also from Yamaguchi and Kagoshima Prefectures.

9. Genus ***Nilodorum*** Kieffer, 1921

tainanus (Kieffer, 1912); *Tendipes*; H. Sauter's Formosa Ausbeute, Suppl. Entomol. (Deut. Entomol. Mus.) **1**, 36; type loc. Taiwan
Hashimoto (1977), p.84; *Chironomus*; M.; Tokai and western parts of Japan
Sasa (1979), p.6; *Chironomus*: M.F.P.L.; eel ponds at Yoshida (Shizuoka)
Sasa & Hasegawa (1983), p.315; *Chironomus*: Okinawa, Ishigaki, Miyako and Ikema Islands (Okinawa)
Hasegawa & Sasa (1987), p.280; *Chironomus*: P.L.; Okinawa Island (Okinawa)

AA(B). The ***Harnischia*** complex of tribe **CHIRONOMINI**

1. Genus ***Cladopelma*** Kieffer, 1921
(=*Cryptocladopelma* Lenz)

viridula (Linnaeus, 1767); Tipula; Syst. Nat., **12**,975; Sweden
Tokunaga (1940), p.301; *Chironomus* (*Cryptochironomus*); M.; Sikuka (Sak-

halin)

Sasa & Hasegawa (1983), p.324; *Harnischia;* M.F.; Ishigaki (Okinawa)

Sasa (1985c), p.35; *Harnischia;* M.F.P.; Lake Ikeda (Kagoshima)

Note: The species described by Tokunaga (1940) from Sakhalin, north of Japan, and that by Sasa & Hasegawa (1983) from Okinawa and by Sasa (1985c) from Kagoshima, both southern Japan, differ especially in the shape of anal point, and their taxonomic status should be revised in future studies.

2. Genus ***Cryptochironomus*** Kieffer, 1918

albofasciatus (Staeger, 1840); Kroeg. Tidskr., **2**, 560,28

Sasa and Kawai (1987a), p.16; M.; Lake Biwa (Shiga)

Sasa (1988c), p.56; Lake Kojima (Okayama)

Sasa (unpublished); River Hiji (Ehime), 10 August 1986

• *fulvus* (Johannsen, 1905) of Sasa & Hasegawa (1893) p.322, renamed as *hentonensis* Hasegawa et Sasa, 1987

hentonensis Hasegawa & Sasa (1987); Jpn. J. Sanit. Zool.,**38**,290; type loc. Hentona (Okinawa)

Sasa (1987), Lake Biwa Stud. Monogr., **3**, 63

javae Kieffer, 1924; Ann. Soc. sci. Brux., **43**,262-270

Sasa & Hasegawa (1983), p.323; M.; Miyako Island (Okinawa)

Hasegawa & Sasa (1987), p.292; P.; Miyako Island (Okinawa)

sauteri Kieffer, 1921; Philipp. J. Sci., **18**,583; F.; Amping (Taiwan); described by female only

Tokunaga (1940), p.301; M.F.; Taihoku (Taiwan)

Note: This species was described by Kieffer (1921) by female only, without figures. Tokunaga (1940) described male and female by this name with specimens collected at Taihoku, but this is again a brief description, with a figure of dorsal appendage of male hypopygium only. As for the Kieffer's specimen, I cannot judge to which genus in the present concept it belongs. Tokunaga's specimens seem to belong to a species of genus *Cryptotendipes* Lenz, or *Microchironomus* Kieffer. Therefore, its generic status is reserved as under the original designation, and awaits for future clarification.

tamaichimori Sasa, 1987; Lake Biwa Stud. Monogr.,3,61; New name for *Cryptochironomus* sp. hentona of Sasa & Ichimori (1983), Res. Rep. Natl. Inst. Environ. Stud., **43**, 103; M.F.; type loc. St. F, Hino Bridge, River Tama (Tokyo)

tamayoroi Sasa et Ichimori, 1983; Res. Rep. Natl. Inst. Environ. Stud., **43**,102; M.F.; type loc. St. D, Yoroi Bridge of River Tama (Tokyo)

Sasa (1987), Lake Biwa Stud. Monogr.,**3**, 61; M.

3. Genus *Cryptotendipes* Lenz, 1941

fujiquartus Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud., **83**, 109; M.F.; type loc. Lake Motosu (Yamanashi); also from Lake Shoji and Yamanaka (Yamanashi)
Sasa & Kawai (1987a), p.17;M.F.; collected on the shore of Lake Biwa (Shiga), 5 June 1985, at W-6 and W-10
Sasa (1988c), p.56; Lake Kojima (Okayama)

oyabeprimus Sasa, Kawai & Ueno(1988), p.32; M; collected at St. 6, Oyabe River (Toyama), 19 Aug. 1987

tamacutus Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**, 6; M.; type loc. St. B, Okutama, River Tama (Tokyo)

4. Genus *Demicryptochironomus* Lenz, 1941

chuzequartus Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud., **70**,47; (misprinted as *chuzenguatus*); M.P.; type loc. Lake Chuzenji (Tochigi)
Sasa (1985c), p.111; M.F.; Lake Yamanaka (Yamanashi)

5. Genus *Harnischia* Kieffer, 1921

acuta (Goetghebuer, 1936); *Chironomus (Harnischia)*; Rev. Zool.Bot. Afr., **28**,470
Sasa & Hasegawa (1983), p.323; M.F.; Shuri (Okinawa)

curtilamellata (Maloch, 1915); Bull.Ill. State Lab. Nat.Hist.,**10**,474
Sasa & Kikuchi (1986), p.20; M.F.; Tokushima-shi (Tokushima); collected with light traps in a rice paddy area
Sasa & Kawai (1987a), p.18; M.; St. W-6, Lake Biwa (Shiga)

japonica Hashimoto, 1984; Kontyu, **52**,262; M.F.P.L.; type loc. Katayama (Shizuoka)
Sasa, Kawai & Ueno (1988), p.32; M; Oyabe River (Toyama)

6. Genus *Microchironomus* Kieffer, 1918

ishiii Sasa, 1987; Lake Biwa Stud. Monogr., **3**, p.66; M; type loc. Lake Kojima (Okayama)
Sasa (unpublished); Lake Kozan (Tottori)
Sasa (1988c), p.56; Lake Kojima

tabarui Sasa, 1987; Lake Biwa Stud. Monogr.,**3**, p.63; M.F; type loc. Lake Kojima (Okayama)
Sasa (1988c), p.56; Lake Kojima (Okayama)

tener (Kieffer, 1918); Entomol. Mitt., 7,48; Europe
Sasa & Kawai (1987a), p.19; M.F.; Lake Biwa (Shiga)

7. Genus ***Parachironomus*** Lenz, 1921

arcuatus Goetghebuer, 1921; Mem. Mus. Hist. Nat. Belg., **31**,163; Europe
Sasa (1985c), p.108; M.F.; Lakes Kawaguchi, Shoji and Yamanaka (Yamanashi)
Sasa & Kawai (1987a), p.20; Lake Biwa; description of male antepronotum
Sasa (1988c), p.56; Lake Kojima (Okayama)

tamanipparai (Sasa, 1983); *Paracladopelma*; Res. Rep. Natl. Inst. Environ. Stud., **43**, 5; M.; type loc. St. C, Hikawa of River Tama (Tokyo)

8. Genus ***Paracladopelma*** Harnisch, 1923

camptolabis (Kieffer, 1913); *Tendipes*; Bull. Soc. Hist. Nat. Metz, 4,40; Europe
Sasa (1984), p.46; M.P.; Lake Chuzenji (Tochigi)
Sasa (1985b), p.37; M.; Lake Miike (Miyazaki)
Sasa (1985c), p.112; M.; Lake Motosu (Yamanashi)
Sasa (1988), p.14; M.; Lake Toya (Hokkaido)

tamahikawai Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud., **43**, 4; M.; type loc. St. C, Hikawa of River Tama (Tokyo)

tamanipparai Sasa, 1983; transferred to *Parachironomus*

AA(C). The ***Polypedilum*** complex of tribe **CHIRONOMINI**

1. Genus ***Ainuyusurika*** Sasa et Shirasaka, 1988

tuberculata (Tokunaga, 1940); Philipp. J. Sci., **72**,290; *Pentapedilum* (*Pentapedilum*); M; type loc. Kitahakutyoko (Sakhalin)
Sasa (1988b), p.80; M.F.; Abasiri (Hokkaido)

2. Genus ***Endochironomus*** Kieffer, 1918

impar (Walker, 1856); *Chironomus*; Ins. Brit. Ill., **97**,174
Hashimoto (1982), p.368; M.; Ozegahara (Tochigi)

pekanus (Kieffer, 1916); *Tendipes*; Ann. Mus. Nat. Hung., **14**,105; M.; type loc. Tainan (Taiwan)
Ree & Kim (1981), p.146; *Endochironomus*, new comb.; M.; collected in Korea
Sasa & Kawai (1987a), p.21; M.; Lake Biwa (Shiga)
Sasa (1988c), p.56; Lake Kojima (Okayama)

3. Genus ***Microtendipes*** Kieffer, 1915

britteni (Edwards, 1929); Chironomus (Microtendipes); Trans. Entomol. Soc. London, **77**,399; England
Sasa (1980), p.29; M.F.P.; Sts. 2 and 3, River Minamiasakawa (Tokyo)
Sasa & Kawai (1987a), p.22; Lake Biwa (Shiga)

chloris (Meigen, 1818); Syst. Beschr., **1**, 28, 17; Europe
Sasa & Kamimura (1987), p.16; M.; Lake Akan (Hokkaido)

* *fuscipennis* (Meigen, 1818) sensu Tokunaga (1940), p.295; *Chironomus (Microtendipes)*; a synonym of *Polypedilum pedestre* (Meigen)

karafutonis (Tokunaga, 1940); *Chironomus (Microtendipes)*;Philipp. J.Sci., 72, 295; M.F.; type loc. Toyohara (Sakhalin)

tamaogouti Sasa, 1983; Res. Rep. Natl.Inst.Environ.Stud., **43**,7; M.F.P.; type loc. Ogouti, River Tama (Tokyo)

truncatus Kawai et Sasa, 1985; Jpn. J. Limnol., **46**,18; M.; type loc. Ohta River (Hiroshima)

* *tsukubaensis* Sasa, 1979; transferred to *Polypedilum*

* *ureshinoensis* Sasa, 1979; transferred to *Polypedilum*

yamasinensis (Tokunaga,1940);*Chironomus* (*Microtendipes*); Philipp. J. Sci., **72**,295; type loc. Yamashina (Kyoto)
Note: This species seems not to belong to genus *Microtendipes* in the present concept, and its taxonomic status should be clarified in future studies.

4. Genus ***Nilothauma*** Kieffer, 1921

brayi (Goetghebuer, 1921); *Kribioxenus;* Mem. Mus. Hist. Nat. Belg., VIII Mem. **31**, *133, 173*; Europe
Sasa (1985b), p.45; M.; Lake Unagi (Kagoshima)
Sasa (1985c), p.112; M.; Lake Sainoko (Yamanashi)

5. Genus ***Paratendipes*** Kieffer, 1911

tamayubai Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud., **43**,9; M.F.P.; type loc. St. A, Yuba, River Tama (Tokyo); also at St. B, Hikawa, River Tama
Sasa & Kawai (1987a), p.22; M.; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.30; River Itachi (Toyama)
Sasa (1988a), p.14; M.; Lake Toya (Hokkaido)

6. Genus ***Pentapedilum*** Kieffer, 1913

kasumiense Sasa, 1979; Res. Rep.Natl.Inst.Environ.Stud., **7**,13; M.F.P.L.; type loc. Tsuchiura (Ibaraki); from a ground pool on the shore of Lake Kasumigaura

Hashimoto (1983), p.21; *Pentapedilum convexum* Johannsen, 1932; M.

Note: Hashimoto (1983) recorded P. *convexum* from Japan, and regarded *kasumiense* Sasa as its synonym. However, according to the original description of *P. convexum* by Johannsen (1932, p.540), it is stated "superior appendages short, slender, tapering, incurved and bare," and without lateral seta in his Fig.30 of hypopygium of this species. Therefore, if this description and illustration is correct, this species seems to belong to another group of this genus, such as *P. nubens* (Edwards), which also has no long lateral seta on dorsal appendage (see page 134 and fig.165c of Pinder, 1978).

nodosum Johannsen, 1932; Trop. Binnengew., 3, Suppl.,**11**,541; M.F.; type loc. Sumatra

Sasa & Hasegawa (1983), p.325; M.; Miyako (Okinawa)

pseudotritum Ree et Kim, 1988; Korean J. Syst. Zool., Spec. Issue No.2, 24; M.; Korea

shirokanense Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud., **7**,10; M.F.P.L.;type loc. Shirokane (Tokyo)

Sasa & Kawai (1987b), p.30; River Itachi (Toyama)

sordens (van der Wulp, 1874); Tijdschr. Entomol., **17**,141; *Tanytarsus;* Europe

Tokunaga (1938), p.321; M.; Amakusa (Kumamoto)

Hashimoto (1983), p.20; M.

Sasa (1985b), p.39; M.; Lake Unagiike (Kagoshima)

Sasa (1985c), p.117; M.; Lake Yamanaka, Kawaguchi and Shoji (Yamanashi)

tigrinum Hashimoto, 1983; Kontyu, **51**,21; M.F.; type loc. Katayama (Shizuoka)

Sasa (1988a), p.15; M; Lake Toya (Hokkaido)

Sasa (1988c), p.56; Lake Kojima (Okayama)

tritum (Walker, 1856); Ins. Brit.,**3**,162; type loc. England

Hashimoto (1983); p.20; M.

Sasa & Kawai (1987b), p.23; M; Lake Biwa (Shiga)

* *tuberculatus* Tokunaga, 1940; transferred to *Ainuyusurika*

sp. unagitertium, Sasa (1985); Res. Rep. Natl. Inst. Environ. Stud., **83**,40; M.; Lake Unagiike (Kagoshima)

uncinatum Goetghebuer, 1921; Mem. Mus. Hist. Nat. Belg.,VII Mem.**31**,110
Sasa & Kikuchi (1986); p.21; M.F.; Tokushima-shi (Tokushima)
Sasa & Kawai (1987b), p.30; River Itachi (Toyama)
Ree & Kim (1988), p.16; M.; Korea

utonaiprimum Sasa, 1988; Res. Rep. Natl. Inst. Environ. Stud.,**121**,12; M; Lake Utonai (Hokkaido)

7. Genus ***Phaenopsectra*** Kieffer, 1921

flavipes (Meigen, 1818); Syst. Beschr.,**1**,50, 67; *Chironomus*; *type loc. Europe*
Hashimoto (1983), p.18; M.; *Pentapedilum*
Sasa & Kikuchi (1986), p.22; M.; Tokushima-shi

kizakiensis (Tokunaga, 1940); p.290; *Pentapedilum*; M.F.; type loc. Lake Kizaki (Nagano)
Hashimoto (1983), p.17; *Pentapedilum*; M.F.; no reference to locality
Sasa (1984), p.54; M.F.P.L.; Lake Yunoko (Tochigi)
Sasa (1988a), p.16; M.; Lake Toya (Hokkaido)

punctipes (Wiedemann, 1817); Zool. Mag.,**1**,1, 65; *Chironomus;* type loc. Europe
Hashimoto (1983), p.19; *Pentapedilum;* no reference to locality
Sasa (1985a), p.10; M.; Lake Utonai, Hokkaido

tamahamurai (Sasa, 1983); Res. Rep. Natl. Inst. Environ. Stud.,**43**,10; *Pentapedilum;* M.; type loc. St. E, Hamura, River Tama (Tokyo)

8. Genus ***Polypedilum*** Kieffer, 1913

(1) The ***nubifer*** group of genus ***Polypedilum***

asakawaense Sasa, 1980; Res. Rep. Natl. Inst. Environ. Stud., **13**,34; M.F.; type loc. St. 5, Asakawa, River Minamiasakawa (Tokyo)
Sasa (1981), p.103; P.L.; collected at Sts. 3 and 4 of River Minamiasakawa, in winter
Sasa (1984), p.59; emerged from samples of Lake Chuzenji and Sainoko (Tochigi)
Sasa (1985c), p.118; Lake Motosu and Shoji (Yamanashi)
Sasa, Kawai Y Ueno (1988), p.28; emerged from a sample collected from Oyabe River (Toyama)

sp. ***chuzenudum***
Sasa (1984), p.63; M.; emerged from bottom sediment of Lake Chuzenji (Tochigi)

medivittatum Tokunaga, 1964; Insects of Micronesia,**12**,588; type loc. Palau (Micronesia)

Sasa & Hasegawa (1983), p.329; M.; Tamagusuku (Okinawa)

nubifer (Skuze, 1889); Proc. Linnean Soc. N.S.W., **2**,249; type loc. Australia

Tokunaga (1936), p.83; *Chironomus (Polypedilum) octoguttatus*, n. sp.; M.F.; Seto (Wakayama)

Sasa (1979), p.15; *P. octoguttatum;* M.F.P.L.; collected from eutrophicated ponds in Ibaraki, Shizuoka and Nagasaki

Sasa & Sublette (1980), p.93; synonymy, ecology and description of M.F.P.L.

Sasa & Hasegawa (1983), p.327; Okinawa, Miyako, Ikema and Ishigaki Islands (Okinawa); all from highly eutrophicated ponds

Sasa & Kawai (1987a), p.24; Lake Biwa (Shiga)

(2) The ***nubeculosum*** group of genus ***Polypedilum***

arundineti Goetghebuer, 1921; Mem. Mus. Hist. Nat. Belg.,**31**,139

Sasa (1985a), p.6; M.F.; Lake Utonai (Hokkaido)

Sasa (1988), p.17; M.; Lake Toya (Hokkaido)

Sasa (1988c), p.56; Lake Kojima (Okayama)

benokiense Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,231; new name

Sasa & Hasegawa (1983), p.328; No.24, *Polypedilum* sp. (Benokiyusurika); M. F.; emerged from River Benoki, Kunigami (Okinawa)

* *edensis* Ree et Kim, 1981; Proc. Coll. Nat. Sci. Seoul Univ.,**6**,161; M.; type loc. Korea; possibly a synonym of *arundineti*

* *fuscipennis* (Meigen, 1818); Tokunaga (1940a), p.295; *Chironomus* (*Microtendipes*); M.; Titori (Sakhalin); a synonym of *P. pedestre* (Meigen)

* *kobotokense* Sasa, 1981, p.101; a synonym of *tsukubaense* Sasa, 1979

kunigamiense Sasa et Hasegawa, 1988; Jpn.J. Sanit. Zool.,**39**,231; new name

Sasa & Hasegawa (1983), p.328; No.23; *Polypedilum* sp. (Kunigamiyusurika); M.; type loc. River Benoki, Kunigami (Okinawa)

kyotoense (Tokunaga,1938);*Chironomus* (*Polypedilum*); Philipp.J.Sci., **65**,328; M.F.P.L.; type loc. Kitashirakawa (Kyoto)

Tokunaga (1959), p.645; P.L.

Sasa (1985d), p.11; Sasa & Igarashi (1985e), p.133; massive emergence in Toyama and its role as a cause of bronchial asthma

Kikuchi et al. (1985), p.333; massive emergence from rice paddies in Tokushima

Sasa & Kawai (1987a), p.24; Lake Biwa (Shiga)

Sasa & Kawai (1987b), p.31; River Itachi (Toyama)

nubeculosum (Meigen, 1804); *Chironomus*; Klass. Beschr. eur. Zweifl. Ins.,18; type loc. ? France (after Townes, 1945 p.49)

Tokunaga (1940), p.297; M.F.; Azabu (Tokyo) and Toyohara (Sakhalin)

Ree & Kim (1981), p. 162; *Polypedilum yongsaensis* sp. nov.; M.F.; collected at various localities in Korea; possibly a synonym of *nubeculosum*

Sasa (1984), p.58; M.F.P.L.; Lake Yunoko and Chuzenji (Tochigi)

Sasa (1985a), p.4; M.F.; Lake Utonai (Hokkaido)

Sasa (1985b), p.42; Lake Unagiike (Kagoshima)

Sasa (1985c), p.118; Lake Ashinoko (Kanagawa), Lake Kawaguchi, Motosu, Shoji and Yamanaka (Yamanashi)

Sasa & Kamimura (1987), p.18; M.; Lake Akan (Hokkaido)

Sasa & Kawai (1987a), p.24; Lake Biwa (Shiga)

Sasa (1988a), p.18; Lake Shikotsu (Hokkaido)

parviacumen Kawai et Sasa, 1985; Jpn. J. Limnol., **46**,19; M.; River Ohta (Hiroshima)

Sasa, Kawai & Ueno (1988), p.28; River Oyabe (Toyama)

pedestre (Meigen, 1860); Syst. Beschr., **6**, 246, 81

Tokunaga (1940), p.295; *Chironomus* (*Microtendipes*) *fuscipennis* (Meigen, 1818); M.; Titori (Sakhalin)

Sasa, Kawai & Ueno (1988), p.33; M.F.P.L.; collected from a mountain stream at Arimine (Toyama)

takaoense Sasa, 1980; Res. Rep. Natl. Inst. Environ. Stud.,**13**,31; M.F.; type loc. St. 1, River Minamiasakawa (Tokyo)

Sasa (1983), p.13; M.; St. A; Yuba, River Tama (Tokyo)

tamagohanum Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**,17; M.F.; type loc. St. C,, Hikawa, River Tama (Tokyo)

Sasa (1984), p.61; M.P.L.; Lake Chuzenji (Tochigi)

Sasa (1985c), p.118; Lake Sainoko (Yamanashi)

Sasa & Kawai (1987b), p.31; River Itachi (Toyama)

tamagoryoense Sasa, 1980; Res. Rep. Natl. Inst. Environ. Stud.,**13**,36; M.F.P.; type loc. St.5, Tamagoryo, River Minamiasakawa (Tokyo)

Sasa & Kawai (1987), p.31; River Itachi (Toyama)

tamaharaki Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**,13; M.F.; type loc. St. A, Yuba, River Tama (Tokyo); also from St. B, Okutama

tamahosohige Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**,16; M.F.;type loc. St.A, Yuba, River Tama (Tokyo)

Sasa, Kawai & Ueno(1988), p.29; St. C-4, River Oyabe (Toyama)

tamanigrum Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**,14; M.F.P.; type loc. St. A, Yuba, River Tama (Tokyo); also from station B (Okutama) and C (Hikawa)
Sasa (1984), p.60; M.; Lake Chuzenji (Tochigi)
Sasa (1985a), p.6; River Teine, Sapporo (Hokkaido)
Sasa, Kawai & Ueno (1988), p.29; emerged from a sample of St. 1, Oyabe River (Toyama)

tsukubaense (Sasa,1979); *Microtendipes*; Res. Rep. Natl. Inst. Environ. Stud.,**7**,17; M. F.P.; type loc. Mount Tsukuba (Ibaraki)
Sasa (1981), p.101; *Polypedilum kobotokense*; St. 2 of River Minamiasakawa (Tokyo); regarded as a synonym of *tsukubaense*
Sasa (1983), p.12; M.; St. A, B and C of River Tama (Tokyo)
Sasa (1988a), p.19; M; Lake Toya (Hokkaido)

unagiquartum Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,41; M.; type loc. Lake Unagiike (Kagoshima)

• *yongsaensis* Ree et Kim, 1981; presumably a synonym of *nubeculosum*

(3) The ***Tripodura*** group of genus ***Polypedilum***

sp. *chuzetripodrum*, Sasa,1984; Res. Rep. Natl. Inst. Environ. Stud., **70**,61; M.; emerged from a bottom sample collected in Lake Chuzenji (Tochigi).

decematoguttatum (Tokunaga, 1938); Philipp. J. Sci., **65**, 337; M.F.; type loc. Shimogamo (Kyoto)

japonicum (Tokunaga,1938); *Chironomus* (*Polypedilum*); Philipp. J. Sci.,**65**,333; M.F.; type loc. Shimogamo (Kyoto)
Sasa & Kikuchi (1986), p.23; M.F.; collected by light trap in a rice paddy area in Tokushima-shi (Tokushima)
Sasa & Kawai (1987a), p.24; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.30; River Itachi (Toyama)
Sasa (1988c), p.56; Lake Kojima (Okayama)
Sasa, Kawai & Ueno (1988), p.28; River Oyabe (Toyama)

masudai (Tokunaga, 1938); *Chironomus* (*Polypedilum*); Philipp.J.Sci.,**65**, 331; M.; type loc. Yamashina (Kyoto)
Sasa (1985b), p.44; M.F.; Lake Ikeda (Kagoshima)
Sasa & Kikuchi (1986), p.24; M.F.; collected by light trap at a rice paddy area in Tokushima-shi (Tokushima)
Sasa (unpublished); Lake Hachirogata (Akita), 29 June, 1979
Sasa & Kawai (1987a), p.24; Lake Biwa (Shiga)
Sasa (1988c), p.56; Lake Kojima (Okayama)

Ree & Kim (1988), p.14; M.; Korea

miyakoense Hasegawa et Sasa (1987); Jpn J. Sanit.Zool.,**38**,292; type loc. Miyako Island (Okinawa)

Sasa & Hasegawa (1983), p.326; *Polypedilum* sp. (Miyakoyusurika); M.F.; from a clean fountain on Miyako Island (Okinawa)

Hasegawa & Sasa (1987), p.292; P.; Miyako Island (Okinawa)

sagittiferum (Tokunaga, 1938); *Chironomus* (*Polypedilum*); Philipp.J. Sci., **65**,335; M.; type loc. Yamashina (Kyoto)

scalaenum (Shrank, 1803); *Tipula;* Fauna boica,**3**,73, 2324; Europe and Palaestina

Sasa (1985a), p.7; M.P.; Lake Utonai (Hokkaido)

Sasa (1988a); p.18; M.; Lake Toya and Utonai (Hokkaido)

tamahinoense Sasa et Ichimori, 1983; Res.Rep. Natl. Inst. Environ. Stud., **43**;103.; M. F.; St. F, Hino, River Tama (Tokyo)

Note: *Polypedilum* sp. chuzetripodrum of Sasa (1984, p.61), collected from Lake Chuzenji (Tochigi), as well as the specimens collected in large numbers in the author's house at Hanamuro (Ibaraki) and tentatively called *Polypedilum hanamuroense* (Sasa,1984, p.61) seem to belong also to this species.

tananense Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool., **39**,230; type loc. Miyako Island (Okinawa)

Sasa & Hasegawa (1983), p.326; *Polypedilum* sp. "Tananeyusurika"; M.F.; from a clean stream at Tanane, Miyako Island (Okinawa)

trinimaculum (Tokunaga, 1940); Philipp. J.Sci.,**72**,297;*Chironomus* (*Polypedilum*); M.F.; type loc. Toyohara (Sakhalin)

unifascium (Tokunaga, 1938); *Chironomus* (*Polypedilum*); Philipp.J.Sci.,**65**,335; F. (*described only by female*); *type loc.* Yamashina (Kyoto)

Sasa (1980), p.32; M.F.P.; Sts. 1 and 2 of River Minamiasakawa (Tokyo)

Sasa (1985c), p.119; M.; Lake Kawaguchi (Yamanashi)

(4) The *cultellatum* group of genus *Polypedilum*

aviceps Townes, 1945; Am. Midl. Nat.,**34**,61; *Polypedilum* (*Polypedilum*); type loc. Ithaca, N.Y. (U.S.A.)

Sasa & Kikuchi (1986), p.25; M.; collected by light traps in a rice paddy area in Tokushima-shi (Tokushima)

Sasa, Kawai & Ueno (1988), p.28; M.F.; Oyabe River (Toyama)

convictum (Walker, 1856)

Sasa & Kawai (1987b), p.30; M.; River Matsukawa (Toyama)

cultellatum Goetghebuer, 1931; Ann. Soc. Entomol. Belg.,**71**,212; Europe

Sasa (1979), p.19; *Microtendipes ureshinoensis;* M.F.P.L.; collected from a polluted stream at Ureshino (Saga)

Sasa (1980), p.37; *Polypedilum ureshinoense;* M.F.P.L.; Sts. 5 and 6 of River Minamiasakawa (Tokyo)

Sasa (1983), p.19; *Polypedilum ureshinoense;* St. F, Hino, River Tama (Tokyo)

Sasa & Hasegawa (1983), p.330; River Hija, and sewage streams at Tomoyose and Kochida, Okinawa Island (Okinawa)

Sasa (1985b), p.42; M.P.; Lake Unagiike (Kagoshima)

Sasa (1985c), p.117; Lake Kawaguchi and Yamanaka (Yamanashi)

Sasa & Kawai (1987a), p.24; St. 10, Otsu, Lake Biwa (Shiga)

Sasa & Kawai (1987b), p.30; River Itachi (Toyama)

Sasa (1988c), p.56; Lake Kojima (Okayama)

Sasa, Kawai & Ueno (1988), p.28; River Oyabe (Toyama)

hiroshimaense Kawai et Sasa, 1985; Jpn. J. Limnol.,**46**,18; M.; type loc. River Ohta (Hiroshima)

tamasemusi Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**,15; M.F.; emerged from samples collected at St. A, Yuba (type loc.), River Tama (Tokyo)

* *ureshinoense* Sasa, 1979; regarded as a variety of *cultellatum*

9. Genus ***Stenochironomus*** Kieffer, 1919

* *bitensis* Kieffer, 1924; Tokunaga & Kuroda (1935), p.1; regarded as a synontm of *gibbus* (Fabricius) by Yamamoto (1981, p.41)

gibbus (Fabricius, 1794); *Tipula*; Entomol. Syst.,**4**,254, 54; Europe

Tokunaga & Kuroda (1935), p.1; *Chironomus (Stenochironomus) bitensis* Kieffer, 1924; collected on light at Mount Daisen (Tottori) and Kamikochi (Nagano);

Note: Goetghebuer (1937, p.12) regarded *bitensis* as a variety of *gibbus;* the description of wing of the Japanese specimens by Tokunaga & Kuroda (1935) fits better to that of *gibbus gibbus* than to *gibbus bitensis* of Goetghebuer (1937).

membranifer Yamamoto, 1981; Bull. Kitakyushu Mus. Nat. Hist.,**3**,47; M.F.; type loc. Shimobaru (Fukuoka); also from Kyoto, Yamaguchi and Fukuoka Prefectures.

Sasa (1985b), p.34; M.; Lake Unagiike (Kagoshima)

Sasa (unpublished); M.; Lake Kozan (Tottori)

nelumbus (Tokunaga et Kuroda, 1935); *Chironomus (Stenochironomus);* Trans. Kansai Entomol. Soc.,**6**,4; M.F.P.L.; type loc. Kyoto; larvae were found in the leaf of Hasu, *Nelumbo nucifera*

Tokunaga and Kuroda (1936), p.4.; biology and control

Tokunaga (1950), p.1536; M.F.
Tokunaga (1973), p.646; M.P.

nubilipennis Yamamoto, 1981; Bull. Kitakyushu Mus. Nat.Hist.,**3**,42; M.F.; type loc. Mount Hikosan (Fukuoka); also from Aomori, Akita, Gifu, Aichi, Oita and Kumamoto Prefectures

oyabearcuatus Sasa, Kawai & Ueno, 1988; Res. Rep. Toyama Pref. Environ. Pollut. Res. Cent., 1988, 35; M.; emerged from a bottom sample collected at C-1, River Oyabe (Toyama)

satorui (Tokunaga et Kuroda,1936);Trans. Kansai Entomol.Soc.,**7**,2; F.; type loc. Yamashina (Kyoto)

takahashii (Tokunaga, 1938); Philipp. J. Sci., **65**,326; F.; type loc. northern Taiwan

10. Genus ***Stictochironomus*** Kieffer, 1919

abasirisecundus Sasa et Shirasaka, 1988; M.; Res. Rep. Natl. Inst. Environ. Stud., **121**,82; type loc.: Abasiri (Hokkaido)

akizukii (Tokunaga, 1940); Philipp. J. Sci., **72**,299; *Chironomus* (*Stictochironomus*); M.F.; type loc. Toyohara (Sakhalin); also from Fukuoka, Wakayama and Tokyo
Hashimoto (1982), p.369; M.; Ozegahara (Tochigi)
Sasa (1984), p.48; M.F.P.L.; emerged from bottom samples of Lake Chuzenji, Yunomko, Marunuma and Suganuma of Nikko (Tochigi)
Sasa (1985b), p.38; M.F.; Lake Miike (Miyazaki)
Sasa (1985c), p.115; Lake Sainoko and Yamanaka (Yamanashi)
Sasa & Kawai (1987a), p.25; St. W-1, Lake Biwa (Shiga)
Sasa (1988a), p.20; M.; Lake Shikotsu and Toya (Hokkaido)

histrio (Fabricius, 1794); Entomol. Syst.,**4**,244, 51; *Tipula*; Europe
Yamamoto (1980), p.24; a record from Japan
Sasa (1985c), p.115; M.F.; Lake Motosu and Yamanaka (Yamanashi)
Sasa & Kamimura (1987), p.17; M.F.; Lake Akan (Hokkaido)
Sasa & Kawai (1987a), p.25; M.F.; Sts. 1, 2 and 3, Lake Biwa (Shiga)

multannulatus (Tokunaga, 1938); *Chironomus* (*Polypedilum*); Philipp. J. Sci., **65**,339; F. (described by female only); type loc. Shimogamo (Kyoto); also from Hita (Oita) and Hachijo (Kyoto)
Yamamoto (1980), p.24; a record from Japan
Sasa (1984), p.51; M.F.P.; Lake Chuzenji (Tochigi)
Sasa (1985c), p.115; Lake Motosu and Saiko (Yamanashi)
Sasa (1988a), p.13; F.; Lake Toya (Hokkaido)

pictulus (Meigen, 1830); Syst. Beschr.,**6**,244; Europe
Yamamoto (1980), p.24; a record from Japan

tamamontuki Sasa et Ichimori,1983;Res.Rep.Natl.Inst.Environ.Stud., **43**,104; M.F.; type loc. St. D, Yoroibashi, River Tama (Tokyo)

AB. Tribe TANYTARSINI

1. Genus ***Biwatendipes*** Tokunaga, 1965

motoharui Tokunaga, 1965; Kontyu, **33**,42; M.F.; type loc. Tsudae, east shore of Lake Biwa (Shiga)
Sasa & Kawai (1987a), p.26; M.F.; St. W-10, Otsu, Lake Biwa (Shiga)

2. Genus ***Cladotanytarsus*** Kieffer, 1922

sinjongensis Ree et Kim, 1988; Korean J. Syst. Zool.Spec.Issue No.2,19; M.; Korea

vanderwulpi (Edwards, 1929); Tanytarsus; Trans. R. Entomol. Soc. London, **77**,418; England
Tokunaga (1940), p.304; M.; Toyohara (Sakhalin)
Sasa & Kawai (1987a), p.28; M.; Lake Biwa (Shiga)

3. Genus ***Micropsectra*** Kieffer, 1911

chuzelonga Sasa,1984; Res. Rep. Natl. Inst. Environ. Stud.,**70**,32; M.P.; type loc. Lake Chuzenji (Tochigi); emerged from a bottom sample of a small stream on the lake shore

chuzenotescens Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud.,**70**,30; M.P.F.; type loc. Lake Chuzenji (Tochigi); from the same stream as the previous species

chuzeprima Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud.,**70**,28; M.F.P.L.; type loc. Lake Chuzenji (Tochigi)

daisenensis (Tokunaga, 1938); *Tanytarsus* (*Micropsectra*); Philipp. J. Sci., **65**,364; M. F.; type loc. Mount Daisen (Tottori)

fossarum (Tokunaga, 1938); *Tanytarsus* (*Micropsectra*); Philipp. J.Sci.,**65**,362; M.F.; type loc. Kitashirakawa (kyoto)

* *miikesecunda* Sasa, 1985 -- Transferred to *Paratanytarsus*

nakaokii Sasa, Kawai & Ueno, 1988; Res. Rep.Toyama Pref.Environ. Pollut. Res. Cent.,1988, 36; M.F.P.L.; type loc. River Joganji (Toyama) M.; type loc.

Kamikoti (Nagano)
Sasa (1988a), p.20; M.; Lake Utonai (Hokkaido)

praecox (Meigen, 1818); Syst. Beschr., 1,49, 64; Europe
Tokunaga (1940), p.305; M.F.; Mount Hiei (Kyoto)

shinaenis (Tokunaga, 1940); Philipp. J.Sci., **72**, 306; *Tanytarsus* (*Micropsectra*); M.; type loc. Kamikoti (Nagano)

subviridis (Goetghebuer, 1922); Mem. Mus. Hist. Nat. Belg., VIII Mem. **31**, 124; Europe
Tokunaga (1940), p.306; M.; Kamikoti (Nagano)

taiwanus (Tokunaga, 1939); *Tanytarsus* (*Micropsectra*); Philipp. J.Sci.,**69**, 336; M.; type loc. Gokan (Taiwan), at altitude of about 3,000m

tamaprima Sasa, 1980; Res. Rep.Natl.Inst.Environ.Stud.,**13**,11; M.F.P.; type loc. St. A, Yuba, River Tama (Tokyo)

utonaitertia Sasa, 1988; Res. Rep.Natl.Inst.Environ.Stud.,**121**,21; M.; type. loc. Lake Utonai (Hokkaido)

yunoprima Sasa, 1984; Res. Rep.Natl.Inst.Environ.Stud.,**70**,26; M.F.P.; type loc. Lake Yunoko (Tochigi)
Sasa (1988a), p.22; M.; Lake Toya (Hokkaido)

4. Genus *Neozavrelia* Goetghebuer, 1941

bicoliocula (Tokunaga, 1938); *Tanytarsus* (*Stempellina*); Philipp. J. Sci., **65**,371; M.F.; type loc.; Kitashirakawa (Kyoto)
Sasa & Kawai (1987a), p.29; M.; collected at St. W-1,2, and E-3, on the shore of Lake Biwa (Shiga)
Sasa & Kawai (1987a), p.30; M.F.; large numbers of adults were collected while swarming in the air at Taikoyama (Toyama)
Sasa & Kawai (1987b), p.31; M.; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.29; River Oyabe (Toyama)

tamanona (***Sasa, 1980***); *Tanytarsus*; Res. Rep. Natl. Inst. Environ. Stud., **13**,25; M.; type loc. St. 3 of River Minamiasakawa (Tokyo); transferred to genus *Neozavrelia* by Sasa & Kawai (1987a), p.30
Sasa (1984), p.42; Lake Chuzenji (Tochigi)
Sasa (1985b), p.51; M.; Lake Unagiike (Kagoshima)

5. Genus ***Paratanytarsus*** Bause, 1913

biwatertius Sasa et Kawai, 1987; Lake Biwa Stud. Monogr.,**3**, 31; M.; St. W-8, Lake Biwa (Shiga)

grimmii (Schneider, 1885); Zool. Beitr., **1**,301-302; *Chironomus*;
Sasa (1979), p.2; F.P.L.; collected in the laboratory of NIES, Tsukuba (Ibaraki), and described as *Paratanytarsus parthenogeneticus* (Freeman, 1961)

inopertus (Walker, 1856); Ins. Brit., **3**,164
Sasa & Kamimura (1987), p.22; M.; Lake Akan (Hokkaido)

miikesecundus (Sasa,1985); *Micropsectra*; Res. Rep. Natl. Inst.Environ.Stud., **83**,52; M.F.; Lake Miike (Miyazaki)
Sasa & Kawai (1987a), p.32; Lake Biwa (Shiga)

* *parthenogeneticus* (Freeman, 1961); *Lundstroemia*; Aust.J.Zool., **9**,611-737; designated as a synonym of *grimmii* (Schneider) by Langton et al. (1988)

stagnarius (Tokunaga, 1938); *Tanytarsus* (*Tanytarsus*); Philipp.J.Sci.,**65**,341; M.F.; type loc. Kitashirakawa (Kyoto); found commonly along stagnant water (new combination)

tamanegi Sasa, 1983; Res. Rep.Natl.Inst.Environ.Stud.,**43**,24; M.F.P.; type loc. St. B, Okutama, River Tama (Tokyo); collected also from St. D, Yoroibashi and E, Hamura.
Sasa & Kawai (1987a) p.32; Lake Biwa (Shiga)

telmatophilus (Tokunaga, 1938); *Tanytarsus* (*Lundstroemia*);Philipp. J. Sci.,**65**,367; M.F.; type loc. Kitashirakawa (Kyoto); found abundantly along marshes

toyaprimus Sasa, 1988; Res. Rep.Natl.Inst.Environ.Stud., **121**,24; M.F.; Lake Toya (Hokkaido)

tredecemarticulus (Tokunaga, 1938); *Tanytarsus* (*Lundstroemia*); Philipp.J. Sci., **65**, 370; M.; type loc. Kibune (Kyoto); collected along a rapid stream

6. Genus ***Pontomyia*** Edwards, 1926

natans Edwards, 1926; Proc. Zool. Soc. London,**51**,796
Tokunaga (1932a), p.1; (1934b), p.1358; M.F.; collected from tide pools at Kushimoto and Takashiba (Wakayama)
Hashimoto (1959), p.57; M.F.P.L.; Sado (Niigata)and Oshoro (Hokkaido)
Hashimoto (1962a), p.221; M.F.; Sado (Niigata)

pacifica Tokunaga, 1932; Dobutsugaku Zasshi, **44**(519),1; M.F.P.L; type loc. Seto

(Wakayama); collected from tide pools
Tokunaga (1932b), p.1; (1932c), p.431; biology
Tokunaga (1943c), p.1357; (1959), p.645; M.F.
Hashimoto (1962a), p.221; M.F.; Yakushima (Kagoshima)

7. Genus ***Rheotanytarsus*** Bause, 1914

aestuarius (Tokunaga, 1938); *Tanytarsus (Rheotanytarsus)*; Philipp. J. Sci.,**65**,360; M. F.; type loc. Karo (Tottori); collected at estuary of a river
Sasa & Kikuchi (1986), p.26; M.; collected by light traps in a rice paddy area in Tokushima-shi (Tokushima)
Sasa & Kawai (1987a), p.32; M.; Sts. W-6 and 10, Lake Biwa (Shiga)
Sasa (1988c), p.56; Lake Kojima (Okayama)

dogoensis Ree et Kim, 1988; Korean J. Syst. Zool., Spec. Issue No.2, 21; M.: Korea

fluminis Kawai et Sasa, 1985; Jpn. J. Limnol.,**46**,20; M.; type loc. St. 9, River Ohta (Hiroshima)

kyotoensis (Tokunaga, 1938); Philipp. J. Sci.,**65**,345; M.F.; type loc. Shimogamo (Kyoto); found abundantly along a slow stream
Sasa (1980), p.19; M.F.P.L.;St. 5 of River Minamiasakawa (Tokyo); a highly polluted part of the stream
Sasa (1983), p.20; St. H, Noborito, River Tama (Tokyo)
Sasa & Kawai (1987b), p.33; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.29; St. T-6, River Oyabe (Toyama)

parvicrinis Tokunaga, 1938; Philipp. J. Sci.,**65**,343; M.F.; type loc. Kibune (Kyoto)

pentapodus (Kieffer, 1909); Bull. Soc. Hist. Nat. Metz., **26**,51
Tokunaga (1938a), p.355; M.F.P.L.; Kitashirakawa (Kyoto); collected from running water
Tokunaga (1959), p.644; P.L.

rivulophilus Kawai et Sasa, 1985; Jpn. J. Limnol.,**46**,21; M.; St. 4, River Ohta (Hiroshima)

tamaquartus Sasa, 1980; Res. Rep. Natl.Inst.Environ.Stud.,**13**,16; M.F.P.; type loc. St. 1, River Minamiasakawa (Tokyo)

tamaquintus Sasa, 1980; Res. Rep.Natl.Inst.Environ.Stud.,**13**,18; M.F.P.; type loc. River Mina miasakawa (Tokyo); collected at Sts. 2 and 3.
Sasa & Kawai (1987b), p.33; River Itachi (Toyama)

tamasecundus Sasa, 1980; Res. Rep.Natl.Inst.Environ.Stud.,**13**,13; M.F.; type loc. St. 1, River Minamiasakawa (Tokyo)

Sasa, Kawai & Ueno (1988), p.29; River Oyabe (Toyama)

tamatertius Sasa, 1980; Res. Rep. Natl.Inst.Environ.Stud.,**13**,14; M.F.; type loc. St. 1, River Minamiasakawa (Tokyo)

thermae (Tokunaga, 1940); *Tanytarsus (Tanytarsus)*; Philipp. J. Sci.,**72**,304; M.F.;type loc. Tsuta-Onsen (Aomori); found abundantly around hotspring

8. Genus ***Stempellina*** Bause, 1913

* *bicolioculus* (Tokunaga, 1938); *Tanytarsus (Stempellina)*; transferred to *Neozavrelia*

okadai (Tokunaga, 1939); *Tanytarsus (Stempellina)*; Philipp. J.Sci.,**69**,337; M.;type loc. Tsubame-Onsen (Niigata); collected from hotspring water

9. Genus ***Tanytarsus*** van der Wulp, 1893

akantertius Sasa & Kamimura, 1987; Res.Rep.Natl.Inst.Environ.Stud., **104**,21; M.; type loc. Lake Akan (Hokkaido)

atagoensis Tokunaga, 1938; Philipp. J. Sci., **65**,348; M.F.; type loc. Mount Atago (Kyoto); found along a rapid stream

biwatrifurcatus Sasa et Kawai, 1987; Lake Biwa Stud. Monogr.,**3**,34; M.F.; St. W-1, Lake Biwa (Shiga)

boodleae Tokunaga, 1933; Philipp. J. Sci.,**51**,358; M.F.; type loc. Seto (Wakayama); found in tide pools covered with boodlea-algae
Tokunaga (1936c), p.316; P.L.; from tide pool at Karatsu (Saga)

chuzesecundus Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud., **70**,38; M.F.P.L.; type loc. Lake Chuzenji (Tochigi)
Sasa (1985c), p.119; Lake Motosu (Yamanashi)

formosanus Kieffer, 1912; Suppl. Entomol.,**1**,42; Taiwan; nomen dubium
Tokunaga (1940), p.303; M.F.; Taihoku (Taiwan); possibly the same species as *oyamai* Sasa, 1979
Hashimoto et al. (1981), p.21; report on the occurrence of this species in Japan

Note: According to Kieffer (1912, p.43, Fig. 16), anal point of *T. formosanus* is narrow, slightly constricted in the middle and with neither spine clusters nor lateral ridges, and thus this species is quite different in structure from *T. oyamai* and apparently belongs to the kirai-group of genus *Tanytarsus*. Since the original description is very poor and ambiguous, this name is treated as "nomen dubium" until the type specimen (if available) be reexamined.

gregarius Kieffer, 1909; Bull. Soc. Hist. Nat. Metz., **26**,50; redescribed in details by Reiss & Fittkau (1971), p.114

Sasa (1984), p.40; M.P.; specimens from Lake Chuzenji (Tochigi) were described as *T. gregarius* Kieffer, but transferred to *nippogregarius* by Sasa & Kamimura (1987, p.21)

Sasa & Kawai (1987a), p.35; M.; Lake Biwa (Shiga)

kikuchii Sasa, Kawai et Ueno, 1988; Res. Rep.Toyâma Pref.Environ. Pollut. Res. Cent., 1988, 38; M.; collected at C-2, River Oyabe (Toyama)

Sasa & Kikuchi (1986), p.29; *Tanytarsus* sp. Tokushima; M.; collected by light trap in rice paddy area in Tokushima-shi (Tokushima)

kirai Sasa et Kawai, 1987; Lake Biwa Stud. Monogr.,**3**,33; M.F.; Sts. W-9, 6 and 2, Lake Biwa (Shiga)

kitaokinawanus Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,231; M.F.; type loc. Benoki (Okinawa)

konishii Sasa et Kawai, 1985; Bull. Toyama Sci.Mus.,**7**,19; M.; type loc. Kameike, Toyama-shi (Toyama); large numbers of M. and F. were collected later from the same locality

Sasa & Kawai (1987a), p.36; M.F.; Lake Biwa (Shiga)

magnihamatus Tokunaga, 1933; Philipp. J. Sci.,**51**,362; M.F.; type loc. Seto (Wakayama); collected on the tidal zone, at a rocky flat seashore

mendax Kieffer, 1925; Ann. Soc. Sci. Brux.,**44**,223

Sasa (1988a), p.28; M.F.; Lake Utonai (Hokkaido)

miikegotoi, sp. nov.; new name for *Tanytarsus tamagotoi*, Miike-form, collected at Lake Miike, in Sasa (1985b), p.50.

miyakobrevis Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,236; M.F.; type loc. Miyako Island (Okinawa)

miyakoflavus Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,233; M.F.; type loc. Miyako Island (Okinawa)

nippogregarius Sasa et Kamimura,1987;Res. Rep.Natl.Inst.Environ.Stud.,**104**,20; M.; type loc. Lake Akan (Hokkaido); also collected from Lake Panke (Hokkaido)

Sasa (1984), p.40; *Tanytarsus gregarius* Kieffer, 1909; M.P.; Lake Yunoko and Chuzenji (Tochigi)

Sasa & Kamimura (1987), p.20; M.; Lake Akan (Hokkaido); described as a new species based on the significant difference from *gregarius* in the number and distribution of the spine clusters on anal point.

okuboi Sasa et Kikuchi, 1986; Jpn. J. Sanit. Zool.,**37**,28; M.F.P.; type loc. Tokushima-shi (Tokushima); collected from rice paddies
Sasa & Kawai (1987a), p.36; M.F.; Lake Biwa (Shiga)

oyabelevis Sasa, Kawai & Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent., 1988, 39; M.; emerged from C-1, River Oyabe (Toyama)

oyabepallidus Sasa, Kawai & Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent.,1988, 40; M.; collected at C-1 and C-4, River Oyabe (Toyama)

oyabeparvulus Sasa, Kawai & Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent., 1988, 41; M.; collected at Y-5, River Oyabe (Toyama)

oyaberotundus Sasa, Kawai & Ueno, 1988; Res. Rep.Toyama Pref. Environ. Pollut. Res. Cent., 1988, 41; M.F.; emerged from C-1, River Oyabe

oyamai Sasa, 1979; Res. Rep.Natl.Inst.Environ.Stud.,**7**,3; M.F.P.L.; collected from concrete pools in NIES, Yatabe (Ibaraki)
Sasa (1980), p.28; St. 5 of River Minamiasakawa (Tokyo)
Sasa (1985b), p.51; M.F.; Lake Unagiike (Kagoshima)
Sasa (1985c), p.119; Lake Kawaguchi (Yamanashi)
Sasa & Kikuchi (1986), p.29; recorded as the most abundant species emerging from rice paddies in Tokushima-shi (Tokushima)
Igarashi et al. (1986), p.687; a case report on bronchial asthma induced by inhalation of a swarming adult of *Tanytarsus oyamai*
Sasa & Kawai (1987a), p.38; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.33; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.29; River Oyabe (Toyama)

pelagicus Tokunaga, 1933; Philipp. J. Sci.,**51**,364; M.F.; type loc. Seto (Wakayama); collected at a rocky seashore
Tokunaga (1938a), p.354; P.; on seashore at Tomioka, Amakusa (Kumamoto)

pontophilus Tokunaga, 1933; Philipp. J. Sci.,**51**,360; M.F.; type loc. Seto (Wakayama); from the same habitat as *T. pelagicus*.

sakishimanus Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,237; M.F.; type loc. Ishigaki Island (Okinawa)

* sp. Tokushima; Sasa et Kikuchi (1986), p.29; M.; (=*kikuchii* Sasa et al., 1988)

* *stagnarius* Tokunaga, 1938; transferred to *Paratanytarsus*

takahashii Kawai et Sasa, 1985; Jpn. J. Limnol.,**46**,22; M.; type loc. River Ohta (Hiroshima)

Sasa & Kawai (1987a), p.38; Lake Biwa (Shiga)

tamadecimus Sasa, 1980; Res. Rep. Natl. Inst. Environ. Stud.,**13**,26; M.; type loc. St. 3, River Minamiasakawa (Tokyo)
Sasa & Kawai (1987b), p.33; River Itachi (Toyama)

tamaduodecimus Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**,21; M.F.; type loc. St. C, Hikawa, River Tama (Tokyo)
Sasa, Kawai & Ueno (1988), p.29; River Oyabe (Toyama)

tamagotoi Sasa, 1983; Res. Rep.Natl.Inst.Environ.Stud.,**43**,23; M.F.; type loc. St. B, Okutama, River Tama (Tokyo); collected also at St. D, Yoroibashi
Sasa (1984), p.43; Lake Chuzenji (Tochigi)
Sasa (1985b), p.49; M.P.; Lake Unagiike and Ikeda (Kagoshima)
Sasa (1985c), p.119; Lake Sainoko (Yamanashi)
Sasa & Kawai (1987a), p.38; Lake Biwa (Shiga)

tamakutibasi Sasa, 1983; Res. Rep.Natl.Inst.Environ.Stud.,**43**,22; M.F.; type loc. St. B, Okutama, River Tama (Tokyo); also from St. D, Yoroibashi
Sasa, Kawai & Ueno (1988), p.43; M.F.P.; emerged from C-1, River Oyabe (Toyama)

tamaoctavus Sasa, 1980; Res. Rep. Natl. Inst. Environ. Stud.,**13**,23; M.F.P.; type loc. St. 1 of River Minamiasakawa (Tokyo); collected also at Sts. 2, 3 and 4 of the same river
Sasa, Kawai & Ueno (1988), p.29; River Oyabe (Toyama)

tamaseptimus Sasa, 1980; Res. Rep. Natl. Inst. Environ.Stud.,**13**,22; M.P.; type loc. St. 1, River Minamiasakawa (Tokyo)

tamaundecimus Sasa, 1980; Res. Rep. Natl. Inst. Environ. Stud.,**13**,27; M.F.P.; type loc. St. 3 of River Minamiasakawa (Tokyo)

unagiseptimus Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,47; M.F.P.; type loc. Lake Unagiike (Kagoshima)
Sasa (1985c), p.119; Lake Shoji (Yamanashi)
Sasa & Kawai (1987a), p.38; Lake Biwa (Shiga)

unagisextus Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,46; M.F.P.; type loc. Lake Unagiike (Kagoshima); also from Lake Ikeda (Kagoshima) and Miike (Miyazaki)

uraiensis Tokunaga, 1938; Philipp. J. Sci.,**65**,350; M.F.P.L.; type loc. Urai-Onsen (Taiwan); collected from hotspring
Hashimoto et al. (1981), p.28; report on the occurrence of this species in Japan

usmaensis Pagast, 1931; Folia Zool. Hydrobiol. **3**,199-248; type loc. Lake Usma, Kurland

Sasa & Kamimura (1987), p.19; M.; Lake Akan (Hokkaido)

utonaiquartus Sasa, 1988; Res. Rep. Natl. Inst. Environ. Stud.,**121**,29; M.F.; type loc. Lake Utonai (Hokkaido)

Tanytarsus sp."utonai" of Sasa(1985a), Res. Rep. Natl. Inst. Environ. Stud., **83**, 9, is also included in this species.

yunosecundus Sasa, 1984; Res. Rep.Natl.Inst.Environ.Stud.,**70**,36; M.F.P.L.; type loc. Lake Yunoko (Tochigi)

Sasa (1985c), p.119; Lake Kawaguchi, Shoji and Yamanaka (Yamanashi)

Sasa & Kikuchi (1986),p.30; M.; Tokushima-shi (Tokushima)

Sasa (1988); Lake Toya (Hokkaido)

10. Genus ***Yuasaiella*** Tokunaga, 1938

kyotoensis Tokunaga, 1938; Philipp. J. Sci., **65**,377; M.F.; type loc. Mount Hiei (Kyoto)

11. Genus ***Zavrelia*** Kieffer, 1920

kibunensis (Tokunaga, 1938); *Tanytarsus* (*Zavrelia*); Philipp. J. Sci., **65**,375; M.; type loc. Kibune (Kyoto); captured along a rapid stream

B. Subfamily ORTHOCLADIINAE

BA. Tribe ORTHOCLADIINI

BA(A).The ***Brillia*** complex

1. Genus ***Brillia*** Kieffer, 1913

japonica Tokunaga, 1939; Philipp. J. Sci.,**69**,306; M.F.; Type loc. Yamashina (Kyoto)

Sasa (1981), p.3; M.F.P.L.; Sts. 1, 2 and 3, River Minamiasakawa (Tokyo)

Sasa (1983), p.70; Sts. A and B, River Tama (Tokyo)

Sasa, Kawai & Ueno (1988), p.29; St. C-4, River Oyabe (Toyama)

longifurca Kieffer, 1921; Bull. Soc. Hist. Nat. Mos., **29**,86; Europe

Sasa (1984), p.81; M.F.P.; emerged from a stream running into Lake Chuzenji (Tochigi)

Sasa & Kawai (1987b), p.36; M.; River Itachi (Toyama)

Sasa (1988); Lake Shikotsu and Toya (Hokkaido)

Sasa, Kawai & Ueno (1988), p.29; St, C-4, River Oyabe (Toyama)

modesta (Meigen, 1830); Syst. Beschr.,**6**,256; Europe

Tokunaga(1939), p.306; M.; Kibune (Kyoto)

2. Genus ***Diplocladius*** Kieffer, 1908

cultriger Kieffer, 1908; Z. wiss. Insektenbiol., 6
Tokunaga (1964b), p.17; M.; Mount Yukyu (Niigata)
Sasa (1984), p.83; M.; collected on the shore of Lake Yunoko (Tochigi)
Sasa & Kawai (1987b), p.37; M.; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.29; St.Y-2, River Oyabe (Toyama)

3. Genus ***Tokunagayusurika*** Sasa, 1978

akamusi (Tokunaga, 1938); Philipp. J. Sci.,**65**,317; *Spaniotoma* (*Orthocladius*); M.F.; Type loc. Osaka
Tokunaga (1950), p.1563; *Orthocladius*; M.F.
Yan Jing-song & Ye Chang-jiang (1977), p.194; *Chaetocladius sexpapillosus* n. sp.; possibly a synonym of *Tokunagayusurika akamusi*
Sasa (1978), p.93; *Tokunagayusurika*; M.F.P.L.; Lake Kasumigaura (Ibaraki)
Sasa & Kawai (1987a), p.49; M.F.; redescription of adults with specimens from Lake Biwa
Sasa (1988c), p.56; a report on the enormous occurrence in Lake Kojima (Okayama)

BA(B). The ***Chasmatonotus*** complex

1. Genus ***Chasmatonotus*** Loew, 1864

brevicornis Yamamoto, 1985; Esakia, **23**,93; M.F.; Type loc. Nikko (Tochigi)

furfurosus Yamamoto, 1985; Esakia, **23**,96; F.; Type loc. Mount Hikosan (Fukuoka)

parabicolor Yamamoto, 1980; Esakia,**10**,89; M.F.; Type loc. Mount Shirouma dake (Nagano)

saigusai Yamamoto, 1980; Esakia,**15**,92; M.F.; Type loc. Mount Kinpusan (Yamanashi)

unilobus Yamamoto, 1980; Esakia,**15**,82; M.F.; Type loc. Hida-Kawai (Gifu)

BA(C). The ***Cricotopus*** complex

1. Genus ***Cricotopus*** van der Wulp, 1874

(1) Subgenus ***Cricotopus***, s. str.

bicinctus (Meigen, 1818); Syst. Beschr., **1**,41; Type loc. Austria

Tokunaga (1936), p.16; M.F.; Kyoto
Sasa (1979), p.37; M.F.P.L.; Nagasaki
Sasa (1980), p.11; River Minamiasakawa (Tokyo)
Sasa (1983), p.72; River Tama (Tokyo)
Sasa (1985b), p.58; Lake Ikeda (Kagoshima)
Sasa & Kawai (1987a), p.39; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.33; River Itachi (Toyama)
Sasa (1988c), p.56; Lake Kojima (Okayama)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

bifascius Tokunaga, 1936; Tenthredo, **1**, 20; M.; Type loc. Uzumasa (Kyoto)

bimaculatus Tokunaga, 1936; Tenthredo, **1**, 27; M.F.; Type loc. Hachijo (Kyoto)
Sasa & Kawai (1987a), p.39; M.: St. E-3, Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.34; M.; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.30; M.F.; Sts. C-4 and Y-2, River Oyabe (Toyama)

* *bituberculatus* Tokunaga, 1940; Philipp. J. Sci.,**72**,286; M.; Type loc. Titori (Sakhalin); This name was preoccupied by another species, and was renamed by Hirvenoja (1973) as *tokunagai*

biwannulatus Sasa et Kawai, 1987; Lake Biwa Stud. Monogr.,**3**,39; M.; Lake Biwa (Shiga)

brevilobus Kawai et Sasa, 1985; Jpn. J. Limnol.,**46**,16; M.; Type loc. River Ohta (Hiroshima)

flavibasalis Tokunaga, 1936; Tenthredo, **1**,28; M.; Type loc. Kitashirakawa (Kyoto)

flavipunctatus Tokunaga, 1936; Tenthredo,**1**,31; F.; Type loc. Kiyotani (Kyoto)

jogantertius Sasa, Kawai & Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent., 1988, 44; M.F.; type loc. Awasuno (Toyama)

metatibialis Tokunaga, 1936; Tenthredo, **1**,21; M.F.; Type loc. Kitashirakawa (Kyoto)
Tokunaga (1950), p.1562; M.F.
Sasa (1981), p.16; M.F.P.; St. No.1, River Minamiasakawa (Tokyo)
Sasa (1983), p.71; St. A, B and D, River Tama (Tokyo)
Sasa & Kawai (1987b), p.35; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

nitens (Kieffer, 1921); *Trichocladius*; Philipp. J. Sci.,**18**,576; collected at Daitotei and Taihoku (Taiwan)
Tokunaga (1940), p.284; M.; Taihoku (Taiwan)

osaruquartus Sasa, 1988; Res. Rep. Natl. Inst. Environ. Stud.,**121**,31; M.; River Osaru (Hokkaido)

oscilator (Meigen, 1818); Syst. Beschr., 1,44, 54; *Chironomus*; Europe
Tokunaga (1936), p.18; F.; Mount Ryozen (Shiga) and Kitashirakawa (Kyoto)

polyannulatus Tokunaga, 1936; Tenthredo,**1**,23; M.F.; Type loc. Kitashirakawa (Kyoto); also from Tokushima and Taihoku (Taiwan)

tamapullus Sasa, 1981; Res. Rep.Natl.Inst.Environ.Stud.,**29**,90; M.F.P.; Type loc. St. No.2, River Minamiasakawa (Tokyo)

tamasimplex Sasa, 1981; Res. Rep.Natl.Inst.Environ.Stud.,**29**,19; M.; Type loc. St. No.3, River Minamiasakawa (Tokyo)
Sasa, Kawai & Ueno (1988), p.30; Sts. C-4 and T-6, River Oyabe (Toyama)

tokunagai Hirvenoja, 1973; Ann. Zool. Fenn.,**10**,337; new name for *Cricotopus bituberculatus* Tokunaga, 1940
Tokunaga (1940), p.286; M.; Type loc. Titori (Sakhalin); this name was preoccupied by *Cricotopus bituberculatus* (Goetghebuer, 1934)
Sasa, Kawai & Ueno (1988), p.45; M.F.; collected at the side of a small stream running into River Oyabe (Toyama)

tremulus (Linnaeus, 1758); *Tipula*; Syst.Nat., 587; Upsala (Sweden)
Tokunaga (1940), p.286; M.; Toyohara (Sakhalin)

triannulatus (Macquart, 1826); Dipt. du Nord de la France.,No.30;Type loc. France
Tokunaga (1936), p.12; M.F.; Kyoto and Shiga
Sasa (1981), p.13; M.P.; St. 5 of River Minamiasakawa (Tokyo)
Sasa (1983), p.72; Sts. C and I of River Tama (Tokyo)
Sasa & Kawai (1987a), p.41; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.35; River Itachi (Toyama)
Sasa (1988a), p.34; F.; Lake Shikotsu (Hokkaido)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

trifascia (Edwards, 1929); *Cricotopus trifascia*; Trans. R.Entomol. Soc. London,**77**, 322; England
Tokunaga (1940), p.285; M.F.; Titori (Sakhalin)

yatabensis Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud., **7**,41; M.F.P.L.; Type loc. Yatabe (Ibaraki)
Sasa (1985c), p.121; M.; Lake Sainoko (Yamanashi)
Sasa & Kawai (1987b), p.35; River Itachi (Toyama)
Note: This species was originally recorded as a member of subgenus *Iso-*

cladius, but should better be placed into this subgenus because pulvilli are vestigial.

yoshimurai Tokunaga, 1936; Tenthredo,**1**,25; M.; Type loc. Takenomura (Fukuoka)

yunoquintus Sasa, 1984; Res. Rep.Natl.Inst.Environ.Stud.,**70**,76; M.F.P.; Type loc. Lake Yunoko (Tochigi)

(2) Subgenus ***Isocladius*** Kieffer, 1909

sylvestris (Fabricius, 1794); Entomol. Syst. em. et Aucta, **4**, 252; Type loc. Kiel, Germany

Tokunaga (1936), p.12; quoted Kieffer's record from Taiwan, and stated he had not seen this species from Japan
Sasa (1979), p.39; M.F.P.L.; Lake Kasumigaura (Ibaraki)
Sasa (1985b), p.57; Lake Unagiike (Kagoshima)
Sasa (1985c), p.120; Lakes Kawaguchi, Shoji and Yamanaka (Yamanashi), and Ashinoko (Kanagawa)
Sasa & Kawai (1987a), p.41; Lake Biwa (Shiga)
Sasa (1988a), p.34; Lake Shikotsu (Hokkaido)
Sasa (1988c), p.56; Lake Kojima (Okayama)

taiwanus Tokunaga, 1940; Philipp. J. Sci., **72**,285; F.; type loc. Sizyukei (Taiwan)

tamannulatus Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud.,**29**,14; M.F.P.; Type loc. River Minamiasakawa (Tokyo)

tricinctus (Meigen, 1818); Syst. Beschr.,**1**,41, 49; *Chironomus*; Type loc. Europe

Tokunaga (1936), p.14; M.F.; Kyoto and Tokushima
Sasa (1981), p.11; M.P.; River Minamiasakawa (Tokyo)
Sasa & Kawai (1987a), p.41; Lake Biwa (Shiga)

trifasciatus (Panzer, 1809); Fauna Germ.,**109**,18 (Meigen, 1818,Syst. Beschr., I,42); *Chironomus*; Europe

Tokunaga (1936), p.15; M.F.; Kyoto and Tottori
Sasa (1981), p.11 and 87, as *C. sylvestris*; River Minamiasakawa (Tokyo)
Sasa (1983), p.72; as *Cricotopus*. sp. "noge" and "yoroi"; River Tama (Tokyo)
Sasa (1984), p.78; M.F.P.L.; Lakes Chuzenji and Sugenuma (Tochigi)
Sasa & Kikuchi (1986), p.31; Tokushima
Sasa & Kawai (1987a), p.41; Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.35; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

(3) Subgenus ***Pseudocricotopus*** Nishida, 1987

matudigitatus Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,34; M.; River Matsu (Toyama)

montanus Tokunaga, 1936; Tenthredo, **1**,29; M.F.; Type loc. Kamikochi (Nagano)
Sasa & Kamimura (1987), p.29; M.; Lake Akan (Hokkaido)
Nishida (1987), p.459; M.F.

nishikiensis Nishida, 1987; Kontyu, **55**,459; M.F.; Type loc. Nishikicho (Yamaguchi)

osarudigitatus Sasa (1988); Res. Rep. Natl. Inst. Environ. Stud.,**121**,31; M; Type loc. iver Osaru (Hokkaido)

tamadigitatus Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud.,**29**,87; M.F.P.; Type loc. St.2, River Minamiasakawa (Tokyo)
Sasa (1983), p.71; St. A, River Tama (Tokyo)
Nishida (1987), p.459; M.F.P.L.; Honshu, Shikoku and Kyushu

2. Genus ***Nanocladius*** Kieffer, 1913
(= *Microcricotopus* Thienamann et Harnisch, 1932)

seoulensis (Ree et Kim, 1981); Proc. Coll. Nat. Sci. Seoul Nat. Univ., **6**,174; *Microcricotopus;* M.; Type loc. Seoul (Korea)

tamabicolor Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud., **29**,22; M.F.P.; Type loc. Sts. 4, 5 and 6 (lower, more polluted parts) of River Minamiasakawa (Tokyo)
Tokunaga (1938), p.319; *Spaniotoma (Eukiefferiella) bicolor* (Zetterstedt, 1843)
Sasa & Kawai (1987a), p.41; M.; St. W-10, Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.36; River Itachi (Toyama)
Sasa (1988a), p.34; M.F.; Lake Utonai (Hokkaido)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

3. Genus ***Paracladius*** Hirvenoja, 1973

akansextus Sasa et Kamimura 1987;Res.Rep.Natl.Inst.Environ.Stud.,**104**,31;M.; Lake Akan (Hokkaido)

4. Genus ***Paratrichocladius*** Santos Abreu, 1918

oyabeangulatus Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent., 1988, p.46; M.; type loc. River Oyabe (Toyama)

rufiventris (Meigen, 1830); Syst. Beschr.,**6**,249, 94; *Chironomus*; Europe
Sasa (1979), p.34; M.F.P.L.; from artificial stream at NIES (Ibaraki)
Sasa (1983), p.71; downstream sites of River Tama (Tokyo)
Sasa (1985b), p.34; Lake Ikeda (Kagoshima)
Sasa (1985c), p.120; Lake Ashinoko (Kanagawa) and Lake Sainoko (Yamanashi)

Sasa & Kawai (1987a), p.43; St. E-3, Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.35; River Itachi (Toyama)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

tamaater Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud., **29**,20; M.F.P.; upstream sites of River Minamiasakawa (Tokyo)
Sasa (1983), p.70; upstream sites of River Tama (Tokyo)
Sasa (1984), p.75; M.P.; Lakes Chuzenji (Tochigi)
Sasa (1988a), p.35; M.; River Osaru (Hokkaido)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

5. Genus ***Rheocricotopus*** Thienemann et Harnisch, 1932

chalybeatus (Edwards, 1929); Trans. R. Entomol.Soc.London,**77**,331; *Spaniotoma* (*Trichocladius*); M.F.; Type loc. England
Tokunaga (1938), p.319; *Spaniotoma* (*Trichocladius*); M.F.; Ikeda (Osaka) and Kitashirakawa (Kyoto)
Sasa & Kawai (1987a), p.43; M.; St. W-10, Otsu, Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.36; River Itachi (Toyama)
Sasa & Hasegawa (1988), p.239; M.F.; Ishigaki, Miyako and Okinawa Islands (Okinawa)
Sasa, Kawai & Ueno (1988), p.30; M.F.; River Oyabe (Toyama)

intermedius (Tokunaga, 1939); Philipp. J. Sci., **69**, 332; *Spaniotoma (Trichocladius)*; M.F.P.L.; Type loc. Kibune (Kyoto)

tamabrevis Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud.,**43**,74; M.; Type loc. St. A. River Tama (Tokyo)
Sasa, Kawai & Ueno (1988), p.30; River Oyabe (Toyama)

tamahumeralis Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud., **29**,92; M.F.P.; Type loc. St. 2, River Minamiasakawa (Tokyo)
Sasa (1983), p.75; St. G., River Tama (Tokyo)

BA(D). The ***Orthocladius*** complex

1. Genus ***Cardiocladius*** Kieffer, 1912

capucinus (Zetterstedt, 1850); Dipt. Scand., **9**,3488; Europe
Tokunaga (1939), p.308; M.F.P.L.; from rapid stream at Kibune and Nishigamo (Kyoto)

esakii Tokunaga, 1939; Philipp. J. Sci., **69**,311; F.; Type loc. Miure (Nagano)

fuscus Kieffer, 1924; Bull. Soc. Hist. Nat. Mos.,**30**,72; Europe
Tokunaga (1939), p.311; F.; collected on light at Miure (Nagano)

2. Genus ***Eukiefferiella*** Thienemann, 1926

* *bicolor* (Zetterstedt, 1843); in Tokunaga (1938), P. 319, as *Spaniotoma (Eukiefferiella) bicolor*; transferred to *Nanocladius*

biwaquarta Sasa et Kawai, 1987; Lake Biwa Study Monogr., No.3, 45; M.F.; type loc. St. W-10, Otsu, Lake Biwa (Shiga)
Sasa (1988c), p.56; Lake Kojima (Okayama)

chuzenona Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud.,**70**,74; M.; type loc. Lake Chuzenji (Tochigi)
Sasa & Kawai (1987b), p.38; M.; River Itachi (Toyama)

chuzeoctava Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud.,**70**,73; M.; type loc. Lake Chuzenji (Tochigi)
Sasa & Kawai (1987b), p.39; M.; River Itachi (Toyama)

coerulescens (Kieffer, 1926); Ann. Soc. Sci. Brux., **45**, 97-103
Sasa & Kawai (1987b), p.41; M.; River Itachi (Toyama)
Sasa (1988a); p.36; M.; Lake Toya (Hokaido)

fujisexta Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud., **83**,126; M.; type loc. Lake Motosu (Yamanashi)

**kibunensis* (Tokunaga, 1939); transferred to *Tokunagaia* Saether

nagaokensis (Tokunaga, 1964); Akitu,**12**,18; *Orthocladius* (sen. str.); M.F.; type loc. Mount Yukyu, Nagaoka (Niigata); collected on snow in March.

Note: This species is transferred to *Eukiefferiella* because anal point is hyaline and lacking lateral seta, and is similar also in other morphological characters to *Eukiefferiella verralli* (Edwards, 1929), according to the original description by Tokunaga (1964).

oyabebrevicosta Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent., 1988, 47; M.; type loc. St. Y-5, River Oyabe (Toyama)

oyaberadiata Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent., 1988, 48; M.; type loc. St. C-4, River Oyabe (Toyama)

takahashii (Tokunaga, 1939); Philipp. J. Sci.,**69**,314; *Spaniotoma* (*Eukiefferiella*); M.; type loc. Mount Niitaka, Taiwan

tamaflava Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud.,**29**,6; M.F.P.; type loc.

River Minamiasakawa (Tokyo)

tentoriola (Tokunaga, 1939); Philipp. J. Sci.,**69**, 321; *Spaniotoma* (*Orthocladius*); M.F. P.L.; type loc. Kibune (Kyoto)

yaraensis Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool., **39**,238; M.; type loc. Yara (Okinawa)

yasunoi Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud.,**7**,31; M.F.P.; type loc. Mount Tsukuba (Ibaraki)

yosiii (Tokunaga, 1964); *Orthocladius* (s. str); Akitu,**12**,17; M.F.; type loc. Mount. Yukyu, Nagaoka (Niigata)

Note: Saether and Halvorsen (1981; Entmol. Scand. Suppl., **15**, 269-285) emended the genus *Eukiefferiella* Thienemann, 1926 in the consept of Brundinn (1956) and Pinder (1978), and divided it into 3 genera, *Tvetenia* Kieffer, 1922, *Dratnaria*, n gen and *Eukiefferiella* Thienemann, 1926. The above Japanese species should ranged in future following this system.

3. Genus ***Heterotrissocladius*** Sparck, 1922

subpilosus (Kieffer, 1911); Avifauna Spitzbergensis (A. Koening, ed.), 273;
Sasa & Kamimura (1987). p.33; M.F.; Lake Kussharo (Hokkaido)
Sasa (1988a), p.36; M.; Lake Toya (Hokkaido)

4. Genus ***Orthocladius*** van der Wulp, 1873

(1) Subgenus ***Euorthocladius*** Thienemann, 1935

chuzeseptimus Sasa, 1984; transferred to subgenus *Orthocladius*

frigidus (Zetterstedt, 1852); Ins. Lapp. p.812; North Europe
Sasa & Kamimura (1987), p.28; M.; Lake Akan (Hokkaido)
Sasa (1988a), p.37; M.; Lake Toya (Hokkaido)

kanii (Tokunaga, 1939); *Spaniotoma* (*Orthocladius*); Philipp. J.Sci.,**69**,315; M.F.P.L.; type loc. Nishigamo (Kyoto); collected from a rapid stream
Tokunaga (1959), p.641; P.L.
Tokunaga (1964b), p.17; M.F.; Nagaoka (Niigata)
Sasa (1979b), p.26; *Orthocladius* (*Euorthocladius*); M.F.P.L.; Mount Tsukuba (Ibaraki) and Yugashima (Shizuoka); all from a rapid stream
Sasa (1981b), p.87; St. 2 of River Minamiasakawa (Tokyo)
Sasa & Kawai (1985), p.16; M.F.; collected in winter season in various localities of Toyama.
Sasa & Kamimura (1987), p.26; M.; Lake Akan (Hokkaido)
Sasa & Kawai (1987b), p.41; River Itachi (Toyama)

Sasa (1988a), p.37; M.; Lake Toya (Hokkaido)

saxosus (Tokunaga, 1939); Philipp. J. Sci.,**69**,326; *Spaniotoma (Orthocladius)*; M.F.P.L.; type loc. Kibune (Kyoto); collected from a rapid mountain stream in March

Tokunaga (1959), p.642; P.L.

Note: This species is tentatively classified in subgenus *Euorthocladius* because, according to Tokunaga (1939, p.326), the thoracic respiratory organ of pupa is small, bare sphere on stalk, such as in *O.(E.) kanii* Tokunaga, and seems to belong to Type I of *Euorthocladius* of Soponis (1977, p.16).

nr. ***saxosus;*** Sasa & Kamimura (1987), p.27; M.; Lake Akan (Hokkaido)

(2) Subgenus ***Orthocladius***, s. str.

sp. ***"akanquartus"***; Sasa & Kamimura (1987), p.26; M.; collected on the shore of Lake Kussharo (Hokkaido)

chuzeseptimus Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud.,**70**,67; M.F.P.L.; type loc. Lake Chuzenji (Tochigi); including "the large form" and "the small form"

Sasa (1985b); Res. Rep. Natl. Inst. Environ. Stud., **83**,53; the *Orthocladius glabripennis* complex, including presumably *O.(O.) glabripennis* and *O.(E.) chuzeseptimus*; M.F.P.; Lakes Unagiike and Ikeda (Kagoshima)

chuzesextus Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud., **70**, 64; M.F.P.L.; Lake Chuzenji (Tochigi)

Sasa (1985c), p.120; Lake Saiko (Yamanashi)

filamentosus (Tokunaga, 1939); Philipp. J. Sci., **69**,329; *Spaniotoma* (*Orthocladius*); M.F.P.L.; type loc. Kibune (Kyoto); collected from a rapid stream

Tokunaga (1959), p.643; P.L.

glabripennis (Goetghebuer, 1921); *Dactylocladius*; Mem. Mus. Hist. Nat. Belg., **31**,85; Lectotype, Belgium (Pinder & Cranston, 1976, p.20)

Tokunaga (1965), p.40; *Orthocladius* (s. str.); M.F.P.; from a stream in northern Kyoto in February

Sasa (1985b), p.53; the *Orthocladius glabripennis* complex; Lake Unagiike and Ikeda (Kagoshima)

Sasa & Kamimura (1987), p.24; M.; Lake Akan (Hokkaido)

Sasa & Kawai (1987a), p.48; Lake Biwa (Shiga)

Sasa & Kawai (1987b), p.43; River Itachi (Toyama)

* *kibunensis* (Tokunaga, 1939); transferred to *Tokunagaia*

makabensis Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud.,**7**,20; M.F.P.L.; type loc. Mount Tsukuba, at Makabe (Ibaraki); collected from mountain streams

suspensus (Tokunaga, 1939); Philipp. J. Sci.,**69**,323; *Spaniotoma* (*Orthocladius*); M.F. P.L.; type loc. Kibune (Kyoto); collected from a rapid mountain stream in March

Tokunaga (1959), p.642; P.L.

Tokunaga (1964), p.17; *Orthocladius* (s. str.); notes on male genitalia and female antenna; Tsuchitaru (Niigata) and Obanazawa (Yamagata) in March

Sasa & Kawai (1985), p.15; M.F.; collected on snow in Toyama, January-March

tamanitidus Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud.,**29**,80; M.F.P.L.; type loc. St. 2 of River Minamiasakawa (Tokyo)

Sasa (1983), p.70; Sts. B and C, River Tama (Tokyo)

tamaputridus Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud.,**29**,82; M.F.P.; type loc. St. 5, River Minamiasakawa (Tokyo); also at Sts. 3 and 4 of the same river, rather polluted sites.

tamarutilus Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud.,**29**,85; M.F.P.; type loc. St. 5, River Minamiasakawa (Tokyo); also at Sts. 3 and 4 of the same river, rather polluted sites.

Sasa & Kawai (1987b), p.43; M.; River Itachi (Toyama)

* *tentoriola* (Tokunaga, 1939); *Spaniotoma* (*Orthocladius*); transferred to *Eukiefferiella*

* *yosiii* Tokunaga, 1964; transferred to *Eukiefferiella*

yugashimaensis Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud.,**7**,23; M.F.P.L.; type loc. River Kano at Yugashima (Shizuoka), from a polluted stream

Sasa (1981b), p.84; Sts. 5 and 6 of River Minamiasakawa (Tokyo).

Note: The following 5 species were described as members of *Spaniotoma* or *Orthocladius* by Tokunaga, (1939, 1940, 1964). They are transferred to the respective genera based on the present concept of taxonomy of Orthocladiinae. The first four species have no anal point.

* *Spaniotoma (Orthocladius) kibunensis* Tokunaga, 1939; transferred to *Tokunagaia* Saether, 1973

* *Spaniotoma (Orthocladius) multannulata* Tokunaga, 1940; to *Tsudayusurika* Sasa, 1985

* *Spaniotoma (Orthocladius) tentoriola* Tokunaga, 1939; to *Eukiefferiella* Thienemann, 1926

* *Orthocladius yosiii* Tokunaga, 1964; to *Eukiefferiella*

* *Orthocladius nagaokensis* Tokunaga, 1964; transferred to genus *Eukiefferiella, because anal point is hyaline, and general structure is closely related to Eukiefferiella verralli* (Edwards, 1929), according to the original description.

5. Genus ***Psectrocladius*** Kieffer, 1906

(1) Subgenus ***Monopsectrocladius*** Wuelker, 1956

yukawana (Tokunaga, 1936); Philipp. J. Sci.,**60**,314; *Spaniotoma* (*Psectrocladius*); M. F.; type loc. Yukawa (Wakayama)

(2) Subgenus ***Psectrocladius,*** s. str.

aquatronus Sasa, 1979; Res. Rep.Natl.Inst.Environ.Stud.,7,28; M.F.P.L.; type loc. Yatabe (Ibaraki)

yunoquartus Sasa, 1984; Res. Rep.Natl.Inst.Environ.Stud.,**70**,69; M.F.P.L.; type loc. Lake Yunoko (Tochigi); collected also from Lake Chuzenji (Tochigi)
Sasa (1985a), p.11; M.P.; emerged from Lake Utonai (Hokkaido)
Sasa (1985b), p.57; M.F.P.; emerged from Lake Unagiike (Kagoshima)
Sasa (1985c), p.120; collected on the shore of Lakes Kawaguchi and Yamanaka (Yamanashi)
Sasa & Kawai (1987a), p.49; St. W-6 to 10, Southern Lake Biwa (Shiga)
Sasa (1988c), p.56; Lake Kojima (Okayama)

6. Genus ***Synorthocladius*** Thienemann, 1935

tamaparvulus Sasa, 1981; Res. Rep.Natl.Inst.Environ.Stud.,**29**,9; M.F.P.; type loc. St. 3 of River Minamiasakawa (Tokyo)

7. Genus ***Tokunagaia*** Saether, 1973

kibunensis (Tokunaga, 1939); *Spaniotoma* (*Orthocladius*);Philipp.J. Sci.,**69**,318; M.F. P.L.; type loc. Kibune (Kyoto)
Saether (1973), p.53; placed *kibunensis* into *Adactylocladius* Saether, 1968 and illustrated the hypopygium (Fig.27A, p.55).
Saether (1973), p.58; created a new genus, *Tokunagaia,* with *kibunensis* (Tokunaga) as the genotype.
Halvorsen & Saether (1987), p.173; redefinition and revision of *Tokunagaia* Saether, 1973

BB. Tribe METRIOCNEMINI

* Genus *Epoicocladius* Zavrel, 1924

* *Epoicocladius chuzendecimus* Sasa 1984; transferred to *Parakiefferiella*

1. Genus ***Chaetocladius*** Kieffer, 1911

oyabevenustus Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref.Environ. Pollut. Res. Cent., 1988, 50; M.; type loc. St. C-4, River Oyabe (Toyama)

2. Genus ***Heleniella*** Gowin, 1943

osarumaculata Sasa, 1988; Res. Rep. Natl. Inst. Environ. Stud.,**121**,39; M.; type loc. River Osaru (Hokkaido)

3. Genus ***Limnophyes*** Eaton, 1875

akanangularius Sasa et Kamimura 1987; Res. Rep. Natl. Inst. Environ. Stud., **104,** 38; M.; type loc. Lake Akan (Hokkaido)

akannonus Sasa et Kamimura 1987; Res. Rep. Natl. Inst. Environ. Stud., **104**,37; M.; type loc. Lake Akan (Hokkaido)
Sasa (1988a), p.41; M.; Lake Toya and Utonai (Hokkaido)

akanundecimus Sasa et Kamimura 1987; Res. Rep. Natl. Inst. Environ. Stud., **104,** 39; M.;type loc. Lake Akan (Hokkaido)

fujidecimus Sasa 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,129; M.; type loc. Lake Kawaguchi, (Yamanashi)

fujinonus Sasa 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,128; M.; type loc. Lake Yamanaka (Yamanashi)
Sasa & Kawai (1987a), p.52; M.F.; Sts. W-2 and 3, Lake Biwa (Shiga)

fuscipygmus Tokunaga, 1940; Philipp. J. Sci.,**72**,287; M.; type loc. Sizyukei (Taiwan)

hudsoni Saether, 1975; Can. Entomol.,**107**,1032; M.F.; type loc. Missouri River, Nebraska; widely distributed in North America
Sasa & Kikuchi (1986), p.31; M.; collected by light traps in Tokushima
Sasa & Kawai (1987b), p.44; M.F.; River Itachi (Toyama)
Sasa (1988a), p.41; M.; Lake Toya and River Osaru (Hokkaido)
Sasa (1988c), p.56; Lake Kojima (Okayama)
Sasa, Kawai & Ueno (1988), p.31; River Oyabe (Toyama)

oyabegrandilobus Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref. Environ.

Pollut. Res. Cent., 1988, 51; M.; type loc. River Oyabe (Toyama)

oyabehiematus Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref. Environ. Pollut. Res. Cent., 1988, 52; M.; type loc. St.C-4, River Oyabe (Toyama)

prolongatus Kieffer, 1921; Arch. Hydrobiol. Suppl., **2**, 791; Europe
Tokunaga (1964b), p.40; M.F.P.; collected at River Koya (Kyoto) in winter
Sasa (1988a), p.42; M.; Lake Toya (Hokkaido)

tamakireides Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud., **43**,78; M.; type loc. St. A, River Tama (Tokyo)
Sasa (1984), p.86; M.F.; emerged from a small stream running into Lake Chuzenji (Tochigi)
Sasa & Kawai (1987b), p.46; M.; River Itachi (Toyama)

tamakitanaides Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud., **29**,97; M.F.; type loc. St. 6, River Minamiasakawa (Tokyo)
Sasa (1985b), p.58; M.F.; Lakes Unagiike and Fudo (Kagoshima)
Sasa & Kawai (1987b), p.46; M.; River Itachi (Toyama)

tamakiyoides Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud., **43**,79; M.; type loc. St. A, River Tama (Tokyo)

4. Genus ***Metriocnemus*** van der Wulp, 1874

hygropetricus Kieffer, 1912; Bull. Soc. Entomol. France p.86
Sasa, Kawai & Ueno (1988), p.53; M.F.; St. C-4, River Oyabe (Toyama)

picipes (Meigen, 1818); Syst. Beschr., **1**,52
Tokunaga (1940), p.284; M.; Sikuka (Sakhalin)

ryutanus Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool., **39**,241; M.; type loc.: Lake Ryutan, Shuri (Okinawa)

tamaokui Sasa, 1983; Res. Rep. Natl. Inst. Environ. Stud., **43**,77; M.P.; type loc. St. A, River Tama (Tokyo)
Sasa (1988a), p.44; M.; Lake Shikotsu (Hokkaido)

5. Genus ***Okayamayusurika*** Sasa, gen. nov.

kojimaspinosa Sasa, sp. nov. (see Part 3); M.; type loc. Lake Kojima (Okayama)

6. Genus ***Okinawayusurika*** Sasa et Hasegawa, 1988
Genotype. *otsurui* Sasa et Hasegawa, 1988

otsurui Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,243; M.; type loc. Ikema Island, Miyako (Okinawa)

* Genus *Orthosmittia* Goetghebuer, 1940

* *bifurcata* (Tokunaga, 1936); transferred to *Pseudosmittia*

* *fujiquinta* Sasa, 1985; transferred to *Toyamayusurika*

7. Genus ***Parachaetocladius*** Wuelker, 1959

akanoctavus Sasa et Kamimura 1987; Res. Rep. Natl. Inst. Environ. Stud., **104**,35; M. F.; type loc. Lake Kussharo (Hokkaido)

8. Genus ***Parakiefferiella*** Thienemann, 1936

bathophila (Kieffer,1912); *Dactylocladius*; Bull. Soc. Entomol. France, **17**,82; Europe
Sasa (1985b), p.60; M.F.P.; Lake Unagiike (Kagoshima)
Sasa, Kawai & Ueno (1988), p.31; St. C-4, River Oyabe (Toyama)

chuzeundecima (Sasa, 1984); Res. Rep. Natl. Inst. Environ. Stud., **70**,89; *Epoicocladius*; M.F.; type loc. Lake Chuzenji (Tochigi)

itachiquarta Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,49; M; River Itachi (Toyama)

osaruflava Sasa, 1988; Res. Rep. Natl. Inst. Environ. Stud.,**121**,44; M.; type loc. River Osaru (Hokkaido)

osarufusca Sasa, 1988; Res. Rep. Natl. Inst. Environ. Stud.,**121**,46: M.; type loc. River Osaru (Hokkaido)

oyabelurida Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref. Environ. Pollut. Res. Cent.,1988,54 ; M.; type loc. St. 1, River Oyabe (Toyama)

tamatriangulata Sasa, 1981; Res. Rep. Natl. Inst. Environ. Stud., **29**,94; M.F.P.; type loc. River Minamiasakawa (Tokyo); emerged from St. 2 and 3
Sasa (1983), p.76; M.F.; emerged from St. A, Tama River (Tokyo)

tipuliformis (Tokunaga,1940); Philipp. J. Sci., **72**,288; *Spaniotoma* (*Smittia*); M.F.; type loc. Arisan (Taiwan)

9. Genus ***Parametriocnemus*** Goetghebuer, 1923

chuzedecimus Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud., **70**, 84; M.F.P.L.; type loc. Lake Chuzenji (Tochigi)

stylatus (Kieffer, 1924); Bull. Soc. Hist. Nat. Mos., **30**,99; Europe
Tokunaga (1939), p.307; *Metriocnemus (Parametriocnemus)*; M.; Nagaoka (Kyoto)
Sasa (1981a), p.25; M.F.P.L.; Sts. 1, 2, 3 of River Minamiasakawa (Tokyo)
Sasa (1981b), p.99; Sts. 3 and 4, River Minamiasakawa (Tokyo)
Sasa (1983b), p.78; Sts. A and B, River Tama, Tokyo
Sasa & Kawai (1987b), p.52; M.; River Itachi (Toyama)

10. Genus ***Paraphaenocladius*** Sparck et Thienemann, 1926

penerasus (Edwards, 1929); Trans. R.Entomol. Soc. London, **77**,315; *Metriocremus*; England
Sasa (1988a), p.49: M.; Lake Toya (Hokkaido)

11. Genus ***Pseudorthocladius*** Goetghebuer, 1932

akanseptimus Sasa et Kamimura,1987; Res.Rep.Natl.Inst.Environ.Stud.,**104**, 32;M.; type loc. Lake Kussharo (Hokkaido)
Sasa (1988b), p.84; Lake Kutcharo (Hokkaido)

fujioctavus Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**, 127; M.; type loc. Lake Yamanaka, also from Lake Motosu (Yamanashi)

fujiseptimus Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,126; type loc. Lake Yamanaka (Yamanashi)

matusecundus Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,52; M; type loc. River Matsukawa (Toyama)

oyabecrassus Sasa, Kawai et Ueno. 1988; Res. Rep. Toyama Pref. Environ. Pollut. Res. Cent., 1988, 55; M.; type loc. St. C-1, River Oyabe (Toyama)

12. Genus ***Pseudosmittia*** Goetghebuer, 1932

bifurcata (Tokunaga, 1936); Philipp. J. Sci., **60**,310; Spaniotoma (Smittia); M.; type loc. Misaki (Kanagawa); collected on seashore; transferred to *Ortho smittia* by Goetghebuer (1940, p. 111), but is again transferred to this genus for reasons discussed in Part 3.

ikemaensis Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,244; M.; type loc. Ikema Island (Okinawa)

itachibifurca Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,54; M.; type loc. River Itachi (Toyama)

itachisecunda Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,53; M; type loc. River Itachi (Toyama)

sp. ***"kojimatertia"***; see Part 3

nishiharaensis Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool., **39**,247; M.F.: type loc. Miyako Island (Okinawa)

toyanigra Sasa, 1988; Res. Rep. Natl. Inst. Environ. Stud.,**121**,48; M.; Lake Toya (Hokkaido)

triappendiculata (Goetghebuer,1931); Bull.Ann.Soc.Entomol.Belg.,**71**,217
Sasa (1985c), p.124; M.; Lakes Motosu and Kawaguchi (Yamanashi)
Sasa, Kawai & Ueno (1988), p.31; St. C-6, River Oyabe (Toyama)

13. Genus *Smittia* Holmgren, 1869

akanduodecima Sasa et Kamimura 1987; Res. Rep. Natl. Inst. Environ.Stud., **104**,42; M.; type loc. Lake Akan (Hokkaido)

aterrima (Meigen, 1818); Syst. Beschr., **1**,47, 59; Europe
Tokunaga (1940), p.289; *Spaniotoma* (*Smittia*); M.; Omu (Hokkaido)
Sasa (1985c), p.121; M.; Lakes Motosu and Yamanaka (Yamanashi)
Sasa & Kamimura (1987), p.41; M.; Lake Akan (Hokkaido)
Sasa & Kawai (1987a), p.53; M.; Sts. Y-1, W-2, 3 and 4, Lake Biwa (Shiga)
Sasa & Kawai (1987b), p.57; M.; River Itachi (Toyama)
Sasa & Hasegawa (1988), M.; Kochinda (Okinawa)
Sasa (1988a), p.49; Lake Toya (Hokkaido)
Sasa (1988c), p.56; Lake Kojima (Okayama)

* *bifurcata* (Tokunaga, 1936); transferred to *Pseudosmittia*

endocladiae (Tokunaga, 1936); Philipp. J. Sci.,**60**,312; *Spaniotoma* (*Smittia*); M.F.; type loc. Seto (Wakayama); collected on rocky seashore
Sublette & Wirth (1988), p.318; included this species into their new genus, *Semiocladius*

gusukuensis Sasa et Hasegawa, 1988; Jpn. J. Sanit. Zool.,**39**,252; M.; type loc. Gusuku (Okinawa)

itachinudiocula Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,59; M; type loc. River Itachi (Toyama)

itachipennis Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,60; M; type loc. River Itachi (Toyama)

itachituberculata Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,60; M; type loc. River Itachi (Toyama)

kojimagrandis Sasa, sp. nov.; Part 3 of this paper; M.; type loc. Lake Kojima (Okayama)

littoralis (Tokunaga, 1936); Philipp. J. Sci.,**60**,303; *Spaniotoma* (*Smittia*); M.F.; type loc. Seto (Wakayama); collected on a gravely seashore

nemalionis (Tokunaga, 1936); Philipp. J. Sci., **60**,305; *Spaniotoma* (*Smittia*); M.F.P.L.; type loc. Seto (Wakayama); collected on algal matting of Rocky seashore
Hashimoto (1962a), p.221; M.F.; biology at Shimoda (Shizuoka)

niitakana Tokunaga, 1939; Philipp. J. Sci., **69**,312; M.; type loc. Mount Niitaka (Taiwan)

nudipennis (Goetghebuer, 1913); Ann. Biol. Lacustre, **5**,19 Europe
Tokunaga (1939), p.312; M.; Mount Niitaka (Taiwan)
Sasa (1985c), p.122; on the shore of Lakes Motosu, Shoji and Yamanaka (Yamanashi)
Sasa & Kamimura (1987), p.41; M.; Lake Panke (Hokkaido)
Sasa & Kawai (1987a), p.53; Sts. Y-1, W-1 and 2, Lake Biwa (Shiga)
Sasa (1988a), p.49; M.; River Osaru (Hokkaido)
Sasa (1988b), p.84; Lake Motoko (Hokkaido)
Sasa (1988c), p.56; Lake Kojima (Okayama)

pratora (Goetghebuer, 1926); Ann. Biol. Lacustre, **15**,101; type loc. Belgium
Sasa & Hasegawa (1988); M.F.; Okinawa and Ishigaki Islands (Okinawa)

sainokoensis Sasa 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,87; M.F.; type loc. Lake Sainoko (Yamanashi)

* *tipuliformis* (Tokunaga, 1940); *Spaniotoma* (*Smittia*); transferred to *Parakiefferiella* by Sublette & Sublette (1973, p.399)

truncatocauda (Tokunaga, 1939); Philipp. J. Sci.,**69**,313; *Spaniotoma* (*Smittia*); M.; type loc. Mount Niitaka (Taiwan)

vesparum Goetghebuer, 1921; Mem. Mus. Hist. Nat. Belg., **31**,169; Belgium
Tokunaga (1940), p.289; *Spaniotoma* (*Smittia*); M.F.; Sikuka (Sakhalin)

14. Genus ***Toyamayusurika*** Sasa et Kawai, 1987
Bull. Toyama Science Museum, **10**,62

fujiquinta (Sasa, 1984); Res. Rep. Natl. Inst. Environ. Stud., **83**,125; *Orthosmittia*; M.; type loc. Lake Yamanaka (Yamanashi)

shiotanii Sasa et Kawai, 1987; Bull. Toyama Sci. Mus., **10**, 62; M; River Itachi (Toyama)
Sasa (1988a), p.49; M.; River Osaru (Hokkaido)

15. Genus ***Trissocladius*** Kieffer, 1908

itachigranulatus Sasa et Kawai, 1987; Bull. Toyama Sci. Mus.,**10**,65; M; River Itachi (Toyama)

16. Genus ***Tsudayusurika*** Sasa, 1985

Res.Rep.Natl.Inst.Environ.Stud.,**83**,62. Genotype: *fudosecunda* Sasa, 1985

fudosecunda Sasa 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,62; M.F.; type loc. Lake Fudo (Miyazaki)

multiannulata (Tokunaga, 1940); *Spaniotoma* (*Orthocladius*); Philipp. J. Sci., **72**,287; M.F.; type loc. Mount Arisan (Taiwan); new combination

BC. Tribe CORYNONEURINI

1. Genus ***Corynoneura*** Winnertz, 1846

celtica Edwards, 1924; Entomol. Mon. Mag.,**60**,182-9; England
Tokunaga (1936d), p.40; M.F.P.; Kibune and Kurama (Kyoto); collected along rapid streams
Tokunaga (1937b), p.33; M.F.
Sasa & Kawai (in press); M.F.P.; St. 1, Oyabe River (Toyama)

cuspis Tokunaga, 1936; Tenthredo, **1**,48; M.F.; type loc. Kitashirakawa (Kyoto); also at Hanazono, Uzumasa and Yodo (Kyoto)

fujiundecima Sasa, 1985; Res. Rep. Natl. Inst. Environ. Stud.,**83**,130; type loc. Lake Yamanaka (Yamanashi)

lobata Edwards, 1924; Entomol. Mon. Mag.,**60**,182-9; England
Tokunaga (1936d), p.42; M.F.; Kibune, Kitashirakawa, Hanazono and Uzumasa (Kyoto)
Tokunaga (1937b), p.35; M.F.
Sasa (1988a), p.50; M.; River Osaru (Hokkaido)

Sasa, Kawai & Ueno (1988), p.31; M.F.P.; St. C-1, River Oyabe (Toyama)

longipennis Tokunaga, 1936; Tenthredo,1,50; M.F.; type loc. Uzumasa (Kyoto); also at Kitashirakawa (Kyoto)
Tokunaga (1937b), p.38; M.F.

tenuistyla Tokunaga, 1936; Tenthredo, **1**,44; M.F.; type loc. Yodo (Kyoto); also at Uzumasa and Yamashina (Kyoto)
Tokunaga (1937b), p.31; M.F.

vittalis Tokunaga, 1936; Tenthredo, **1**,45; M.F.; type loc. Kitashirakawa (Kyoto)
Tokunaga (1937b), p.34; M.F.

yoshimurai Tokunaga, 1936; Tenthredo, **1**,46; M.F.; type loc. Kitashirakawa, (Kyoto); also at Uzumasa and Yamashina (Kyoto)
Tokunaga (1937b), p.36; M.F.

2. Genus ***Thienemanniella*** Kieffer, 1911

chuzeduodecima Sasa, 1984; Res. Rep. Natl. Inst. Environ. Stud.,**70**,90; M.F.; type loc. Lake Chuzenji (Tochigi)

flaviscutella (Tokunaga, 1936); Tenthredo,1,39; M.F.; type loc. Yamashina (Kyoto); also at Uzumasa (Kyoto)
Tokunaga (1937b), p.29; M.F.

lutea (Edwards, 1924); Entomol. Mon. Mag.,**60**,182-9; *Corynoneura (Thienemanniella)*; England
Tokunaga (1936d), p.37; *Corynoneura (Thienemanniella)*; M.F.; Yamashina and Uzumasa (Kyoto)
Tokunaga (1937b), p.27; M.F.

majuscula (Edwards, 1924); Entomol. Mon. Mag.,**60**,182-9; *Corynoneura (Thienemanniella)*; England
Tokunaga (1936d), p.34; M.F.P.; Kitashirakawa, Yodo and Yamashina (Kyoto)
Tokunaga (1937b), p.26; M.F.

morosa (Edwards, 1924); Entomol. Mon. Mag., **60**,182-9; *Corynoneura (Thienemanniella)*; England
Sasa & Kawai (1987b), p.67; River Itachi (Toyama)

nipponica (Tokunaga, 1936); Tenthredo,1,38; *Corynoneura (Thienemanniella)*; M.; type loc. Kitashirakawa (Kyoto)
Tokunaga (1937b), p.28; M.

oyabedilata Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref. Environ. Pollut.

Res. Cent., 1988, 57; M.F.; type loc. St. C-4, River Oyabe (Toyama)

vittata (Edwards, 1924); Entomol. Mon. Mag.,**60**,182-9; *Corynoneura (Thienemanniella)*; England
Sasa & Kawai (1987a), p.54; Lake Biwa (Shiga)

BD. Tribe CLUNIONINI

1. Genus ***Clunio*** Haliday, 1855

aquilonius Tokunaga, 1938; Ann. Zool. Jpn.,**17**,126; M.F.; type loc. Akkeshi (Hokkaido), collected on seashore; also from Shimoda (Shizuoka) and Miyatojima (Miyagi)
Hashimoto (1962), p.221; Esashi (Hokkaido)

pacificus Edwards, 1926; Proc. Zool. Soc. London, **51**,779-806; type loc. Samoa
Oka (1926), p.205; biology at Misaki (Kanagawa)
Oka (1930), p.253; M.F.
Esaki (1932), p.164; M.F.; Misaki (Kanagawa) and Tsushima (Nagasaki)
Oka (1933), p.76; M.F.; Misaki (Kanagawa)
Tokunaga (1935a), p14; (1935b), p.14; (1937b), p.18; M.F.; Ishigaki (Okinawa)
Esaki (1950), p.1560; M.F.

purpureus Hashimoto, 1962; Sci. Rep. Tokyo Kyoiku Daigaku,Sec.B., No.159, 285-296; M.F.P.L.; type loc. Shimoda (Shizuoka)

setonis Tokunaga, 1933; Philipp. J. Sci.,**51**,89; M.; type loc. Seto (Wakayama); collected on seashore
Tokunaga (1935a), p.13; Ishigaki (Okinawa) and Toshi-Wagu (Mie)
Tokunaga (1935b), P.13; M.P.
Tokunaga (1937b), M.

takahashii Tokunaga, 1938; Philipp. J. Sci.,**65**,314; M.; type loc. Tansui (Taiwan); collected on seashore
Hashimoto (1965), p.13; M.F.; Tanegashima, Amami-oshima and Kikaijima (Kagoshima)

tsushimaensis Tokunaga, 1933; Philipp. J. Sci.,**51**,92; M.; type loc. Tsushima (Nagasaki); collected on rocky seashore
Tokunaga (1935a), p.8; F.P.L.; Okinoshima (Fukuoka), Seto and Tanabe (Wakayama), Anori (Mie)
Tokunaga (1935b), F.P.L.
Tokunaga (1937b), p.19; M.F.
Tokunaga (1959), p.638; P.L.

tsushimaensis var. ***minor*** Tokunaga, 1933; Philipp. J. Sci.,**51**,93; M.F.; type loc. Seto

(Wakayama); collected on rocky seashore
Tokunaga (1935a), p.13; P.L.; Shuku-taso (Mie)
Tokunaga (1935b), p.13; F.P.L.
Tokunaga (1937b), p.20; M.F.

2. Genus ***Telmatogeton*** Schiner, 1866

japonicus Tokunaga, 1933; Philipp. J. Sci.,**51**,95; M.F.; type loc. Karo (Tottori); also Seto (Wakayama); collected on rocky seashore
Tokunaga (1935a), p.491; P.L.
Tokunaga (1935b), p.16; Tokunaga (1937b), p.22; M.F.
Tokunaga (1959), p.637; P.L.
Hashimoto (1962), p.243; biology of M.F.

pacificus Tokunaga, 1935; Mushi,**8**,15; F.; type loc. Seto (Wakayama); collected on rocky seashore
Tokunaga (1937b), p.23; M.F.

3. Genus ***Thalassomyia*** Schiner, 1856

japonica Tokunaga et Komyo, 1955; Publ. Seto Mar. Biol. Lab., **4**,364; M.F.; type loc. Nakanoshima, Tokara Islands (Kagoshima)

C. Subfamily DIAMESINAE

CA. Tribe DIAMESINI

1. Genus ***Diamesa*** Meigen, 1838

alpina Tokunaga, 1936; Philipp. J. Sci.,**59**,539; M.F.P.L.; type loc. Tsurugisawa, Japan Alps (Toyama); also at Kakogawa (Nagano)
Tokunaga (1937b), p.59; M.F.
Goetghebuer (1939), p.26; M.

astyla Tokunaga, 1936; Philipp. J. Sci.,**59**,545; M.; type loc. Tsurugisawa Japan Alps (Toyama); collected at altitudes 1,600-2,000 m on snow in November
Tokunaga (1937b), p.57; M.
Goetghebuer (1939), p.27; M.

breviala Tokunaga, 1964; Akitu,**11**,39; type loc. Tsuchitaru (Niigata); collected on snow in March

japonica Tokunaga, 1936; Philipp. J. Sci.,**59**,542; M.F.P.; type loc. Kashima, Japan Alps (Nagano); collected on snow at altitudes of about 2,000m in June; also Sasagamine (Niigata), Kinebashi (Fukui) and Hosono (Nagano) in February and March, on snow.

Tokunaga (1937b), p.58; M.F.
Goetghebuer (1939), p.27; M.

japonica var. No.1 of Tokunaga, 1936; Philipp. J. Sci.,**59**,545; F.; collected on snow in March and April at Seki and Sasagamine (Niigata)

matuimpedita Sasa, sp. nov.: see Part 3 of this paper

plumicornis Tokunaga, 1936; Philipp. J. Sci., **59**,548; M.; type loc. Mount Hiei (Kyoto); collected in March
Tokunaga (1937a), p.55; F.
Tokunaga (1937b), p.62; M.
Goetghebuer (1939), p.27; M.

tsukuba Sasa, 1979; Res. Rep. Natl. Inst. Environ. Stud.,**7**,46; M.F.P.L.; type loc. Mount Tsukuba (Ibaraki); collected and reared from mountain streams

tsutsuii Tokunaga, 1936; Philipp. J. Sci.,**59**,546; M.F.; type loc. Hosono (Nagano); collected in March
Tokunaga (1937b), p.60; M.F.
Goetghebuer (1939), p.27; M.
Tokunaga (1964c), p.22; *Diamesa (Adiamesa)*; Mount Yukyu, Tsuchitaru and Ishiuchi (Niigata); collected in March on snow
Sasa & Kawai (1985), p.10; F.; collected on wall in March, at Sugitani (Toyama)

sp. (No.1) of Tokunaga (1936); Philipp. J. Sci., **59**,549; F.; Seki (Niigata), collected in March

sp. (No.2) of Tokunaga (1936); Philipp. J. Sci., **59**,550; F.; Seki (Niigata), collected in March

2. Genus ***Heptagyia*** Philippi, 1865

brevitarsis (Tokunaga, 1936); *Prodiamesa* (*Monodiamesa*); Philipp.J. Sci.,**59**,528; M.; type loc. Kibune (Kyoto)
Tokunaga (1937b), p.42; M.
Goetghebuer (1939), p.27; M.
Tokunaga (1959), p.639; Heptagyia; P.L.; Kibune (Kyoto)

eburnea Tokunaga, 1937; Philipp. J. Sci.,**62**,60; F.; type loc. Mount Ryozen (Shiga), collected in June
Tokunaga (1937b), p.53; F.
Goetghebuer (1939), p.28; F.

nipponica Tokunaga, 1937; Philipp. J. Sci., **62**,58; F.; type loc. Kibune (Kyoto); collected at light in October
Tokunaga (1937b), p.52; F.
Goetghebuer (1939), p.28; F.

3. Genus ***Potthastia*** Kieffer, 1922

longimana Kieffer, 1922; Ann. Soc. Scient. Brux.,**46**,361; type loc. Germany
Tokunaga (1965b), p.39; described as *Diamesa (Psilodiamesa) campestris* (Edwards, 1924), which is a synonym of *longimana* Kieffer; M.F.P.; River Kamo (Kyoto); collected in February

matunigra (Sasa et Kawai), 1987; Bull. Toyama Sci. Mus.,**10**,68; *Psilodiamesa;* M.; River Itachi (Toyama)

montium (Edwards, 1929); Trans. R. Entomol. Soc. London, **77**,307; *Diamesa* Sasa (1988a). p.51; *Psilodiamesa;* M.; Lake Toya (Hokkaido)

nigatana (Tokunaga, 1936); *Diamesa (Psilodiamesa)*; Philipp.J.Sci.,**59**,537; M.; type loc. Sasagamine (Niigata); collected on snow in March
Tokunaga (1937b), p.55; *Diamesa (Psilodiamesa)*; M.
Goetghebuer (1939), p.26; *Diamesa (Psilodiamesa)*; M.
Sasa & Kawai (1985), p.12; *Psilodiamesa*; F.; River Kumano (Toyama); collected in March

4. Genus ***Pseudodiamesa*** Goetghebuer, 1939

The following two species were described only by female and classifed as members of genus Lasiodiamesa Kieffer by Tokunaga. They were differentiated from other Japanese Diamesinae species by the presence of macrotrichiae on wing.

crassipilosa Tokunaga, 1937; *Lasiodiamesa*; Philipp. J. Sci., **62**,57; F.; type loc. Kibune (Kyoto); collected in March
Tokunaga (1937b), p.45; *Lasiodiamesa;* F.
Goetghebuer (1939), p.26; *Lasiodiamesa*; F.

nivis Tokunaga, 1936; Philipp. J. Sci.,**59**,535; *Lasiodiamesa*; F.; type loc. Haruizawa (Niigata); also at Tsubame and Sasagamine (Niigata) and Kashima (Nagano), all on snow in March or April
Tokunaga (1937b), p.44; *Lasiodiamesa*; F.
Goetghebuer (1939), p.26; *Lasiodiamesa*; F.

5. Genus ***Syndiamesa*** Kieffer, 1918

bicolor Tokunaga, 1937; Philipp. J. Sci.,**62**,56; F.; type loc. Kibune (Kyoto); collected in March

Tokunaga (1937b), p.48; F.
Goetghebuer (1939), p.25; F.

chuzemagna, sp. nov.; new name for *Syndiamesa* sp., Sasa (1984), p.93; M.; type loc. Lake Chuzenji (Tochigi)

kashimae Tokunaga, 1936; Philipp. J. Sci., **59**,534; M.; type loc. Kashima, Japan Alps (Nagano); collected on snow in April at high mountain slope
Tokunaga (1937b), p.44; F.
Goetghebuer (1939), p.26; F.

lanceolata Tokunaga, 1936; Philipp. J. Sci., **59**,530; M.; type loc. Kitashirakawa (Kyoto); captured in March
Tokunaga (1937b), p.47; M.
Goetghebuer (1939), p.25; M.

montana Tokunaga, 1936; Philipp. J. Sci.,**59**,532; M.P.; type loc. Tsurugisawa, Japan Alps (Toyama); collected at high altitude in October
Tokunaga (1937b), p.50; M.
Goetghebuer (1939), p.25; M.

sp. No.1, Tokunaga (1936), p.536; *Syndiamesa* (*Syndiamesa*); F; Sasagamine (Niigata)

takatensis Tokunaga, 1936; Philipp. J. Sci., **59**,531; M.; type loc. Takata (Niigata); collected on spring snow
Tokunaga (1937b), p.49; M.
Goetghebuer (1939), p.25; M.
Sasa & Kawai (1985), p.7; M.F.; collected on snow at Sugitani (Toyama), from January to March
Sasa & Kawai (1987b), p.69; River Itachi (Toyama)

yosiii Tokunaga, 1964; Akitu, **12**,22; type loc. Ishiuchi (Niigata); collected on snow in March

CB. Tribe PRODIAMESINI

1. Genus *Monodiamesa* Kieffer, 1921

bathyphila (Kieffer, 1918); *Prodiamesa (Monodiamesa)*; Entomol. Mitt., **7**,102; Europe
Tokunaga (1936a), p.527; M.; Shibutani (Kyoto)
Tokunaga (1937b), p.41; M.
Sasa & Kawai (1987a), p.54; M.F.; Lake Biwa (Shiga)

* *brevitarsis* (Tokunaga, 1937a, b); *Prodiamesa* (*Monodiamesa*); transferred to *Heptagyia*

2. Genus *Prodiamesa* Kieffer, 1911

chuzenigra Sasa sp. nov.; New scientific name for (40) *Prodiamesa* sp. of Sasa (1984, Res. Rep. Natl. Inst. Environ. Stud., **70**,91; M.F.L.P.; Lake Chuzenji (Tochigi)

nagaii Sasa et Kawai, 1985; Bull. Toyama Sci. Mus.,7,13; M.F.; type loc. River Kumano, Toyama-shi (Toyama)

D. Subfamily TANYPODINAE

Note: Most of the species listed here were recorded by Tokunaga (1937-40) following the classical system. They are adapted in this list to the new system proposed mainly by Fittkau (1962) and Pinder (1978), as much as possible. A part of Tokunaga's species were classified by Fittkau (1962) according to his new system, but others cannot be placed due to the brief original description. As shown in the following list, Fittkau (1962) gave new names to most of the Japanese species classified by Tokunaga into species already known from Europe, without giving accounts on why they were separated as independent ones. Since some of them examined by the present author could not be separated from the European species, Tokunaga's old names are mostly reserved in the present list.

DA. Tribe COELOTANYPODINI

1. Genus *Clinotanypus* Kieffer, 1913

decempunctatus Tokunaga, 1937; Philipp. J. Sci.,**62**,23; F.; type loc. Shimogamo (Kyoto); also from Yamashina (Kyoto) and Imaizumi (Aomori)
Tokunaga (1937b), p.65; F.

formosae Kieffer, 1916; Ann. Mus. Nat. Hung.,**14**,99; F.; collected at Anping and Takao (Taiwan)
Kieffer (1921); Philipp. J. Sci., **18**,576
Tokunaga (1937a), p.22; (1937b), p.65; F.

immaculatus Kieffer, 1916; Ann. Mus. Nat. Hung.,**14**,99; F.; collected at Tainan (Taiwan)
Tokunaga (1937a), p.24; (1937b), p.67; F.

japonicus Tokunaga, 1937; Philipp. J. Sci.,**62**,25; M.; type loc. Kinugasa (Kyoto)
Tokunaga (1937b), p.98; M.

lampronotus Kieffer, 1916; Ann. Mus. Nat. Hung.,**14**,100; M.; collected at Takao (Taiwan).
Tokunaga (1937a), p.25; (1937b), p.68; M.

sugiyamai Tokunaga, 1937; Philipp. J. Sci.,**62**,26; M.; type loc. Uzumasa (Kyoto)
Tokunaga (1937b), p.69; M.
Sasa & Kawai (1987a), p.57; M.F.; St. W-10, Otsu, Lake Biwa (Shiga)
Sasa (1988a), p.52; M.F.; Lake Utonai (Hokkaido)

DB. Tribe MACROPELOPINI

1. Genus ***Apsectrotanypus*** Fittkau, 1962

yoshimurai (Tokunaga), 1937; Philipp. J. Sci.,**62**,38; *Anatopynia*; F.; type loc. Uzumasa (Kyoto)
Tokunaga (1937b), p.80; F.
Fittkau (1962), p.151; treated this species as "? *Apsectrocladius yoshimurai* (Tokunaga)"

2. Genus ***Macropelopia*** Thienemann, 1916

goetghebueri (Kieffer, 1918); Entomol. Mitt., **7**,168
Tokunaga (1937a), p.39; (1937b), p.82; *Anatopynia*; M.F.; Shimogamo and Miyake-Hachiman (Kyoto)
Fittkau (1962), p.114; gave a new name, *Macropelopia tokunagai*

japonica (Tokunaga, 1937); Philipp. J. Sci.,**62**,41; *Anatopynia*; M.; type loc. Hachijo (Kyoto)
Tokunaga (1937b), p.83; *Anatopynia*; M.
Fittkau (1962), p.114; placed to *Macropelopia*

kibunensis (Tokunaga, 1937); Philipp. J. Sci.,**62**,41; *Anatopynia*; F.; type loc. Kibune (Kyoto)
Tokunaga (1937b), p.82; *Anatopynia*; F.
Fittkau (1962), p.114; placed to *Macropelopia*

nebulosa (Meigen, 1804); Klass. Beschr. Eur. Zweifl. Insk.,**1**, 21
Tokunaga (1937a), p.40; *Anatopynia*; F.; Kibune (Kyoto) and Tsuta (Aomori)
Tokunaga (1937b), p.82; *Anatopynia*; F.
Tokunaga (1939), p.299; *Anatopuynia*; M.P.; Kitashirakawa (Kyoto)
Fittkau (1962), p.113; gave a new name, *Macropelopia paranebulosa*

oyaberobusta Sasa, Kawai & Ueno, 1988; Res. Rep. Toyama Pref. Environ. Pollut. Res. Cent., 1988, 58; M.F.P.; type loc. St. C-4, River Oyabe (Toyama)

3. Genus ***Procladius*** Skuse, 1887

choreus (Meigen, 1804); Klass. Beschr. Eur. Zweifl. Insk., **1**,236; Europe, Africa and Asia
Tokunaga (1937a), p.29; M.F.; Hachijo (Kyoto) in May and Seto (Wakayama)

in June

Tokunaga (1937b), p.72; M.F.

Sasa and Kawai (1987a), p.59; M.; St. W-10, Otsu, Lake Biwa (Shiga)

Sasa (1988a), p.53; M.; Lake Utonai (Hokkaido)

crassinervis (Zetterstedt, 1838); Dipt. Scand. (Sect. 3), 477-868

Tokunaga (1937a), p.31; M.F.; Arashiyama (Kyoto) in May, Mount Ryozen (Shiga) in June and Ikeda (Osaka) in May

Tokunaga (1937b), p.73; M.F.

insularis (Kieffer, 1921); *Trichotanypus*; Philipp. J. Sci., **18**, 574; M.F.; Daitotei (Taiwan)

Tokunaga (1937a), p.30; (1937b), p.74; *Procladius (Procladius)*; M.F.

iris (Kieffer, 1916); *Trichotanypus*; Ann. Mus. Nat. Hung., **14**, 101; F.; Yentenpo (Taiwan)

Tokunaga (1937a), p.30; (1937b), p.73; F.

Sasa and Kawai (1987a), p.59; Lake Biwa (Shiga)

karahutoensis Tokunaga, 1940; Philipp. J. Sci.,**72**,282; M.F.; type loc. Shikuka (Sakhalin)

lacteiclavus (Kieffer, 1922); *Trichotanypus*; Ann. Soc. Linn. Lyon, **69**,41; M.F.; Daitotei and Maruyama (Taiwan)

Tokunaga (1937a), p.31; (1937b), p.74; *Procladius (Procladius)*; M.F.; (redescription)

nipponicus Tokunaga, 1937; Philipp. J. Sci.,**62**,32; M.F.; type loc. Kibune (Kyoto); also at Hachijo (Kyoto), May through August

Tokunaga (1937b), p.75; M.F.

sagittalis Kieffer, 1909; Bull. Soc. Hist. Nat. Metz, **26**,42; Europe

Tokunaga (1937a), p.28; M.F.; Shimogamo, Yamashina and Yoshida (Kyoto), and Toba (Mie), from July to October

Tokunaga (1937b), p.75; M.F.

Sasa (1988a), p.51; M.; Lake Utonai (Hokkaido)

4. Genus ***Psectrotanypus*** Kieffer, 1909

varius (Fabricius, 1787); Mantissa Ins., **2**,325. 45

Tokunaga (1937a), p.35; *Psectrotanypus*; M.F.P.L.; Kitashirakawa and Kibune (Kyoto), Mount Ryozen (Shiga), Mount Daisen (Tottori)

Tokunaga (1937b), p.79; *Anatopynia*; M.F.

Tokunaga (1959), p.639; *Anatopynia*; P.L.

Fittkau (1962), p.140; gave a new name, *Psectrotanypus orientalis*

DC. Tribe PENTANEURINI

1. Genus ***Ablabesmyia*** Johannsen, 1905

monilis (Linnaeus, 1763); Fauna suec. Ed. II, 436; *Tipula*

Tokunaga (1937a), p.44; *Pentaneura*; M.F.; Shimogamo, Hachijo, Arashiyama, Kibune, Yamashina, Uzumasa and Kitashirakawa (Kyoto), Daisen and Karo (Tottori), Seto (Wakayama), Iyayama (Tokushima)

Tokunaga (1937b), p.87; *Pentaneura*; M.F.

Tokunaga (1959), p.638; *Pentaneura*; P.L.

Fittkau (1962), p.430; placed this species to *Ablabesmyia* Johannsen, 1905, and gave a new name, *A. moniliformis*, to Tokunaga's *monilis*

Sasa and Kawai (1987a), p.55; *Ablabesmyia*; M.F.; Lake Biwa (Shiga)

Sasa, Kawai & Ueno (1988), p.31; St. C-1, River Oyabe (Toyama)

2. Genus ***Conchapelopia*** Fittkau, 1957

esakiana (Tokunaga, 1939); Philipp. J. Sci.,**69**,302; *Pentaneura*; M.; type loc. Miure, Otaki-Mura (Nagano)

Fittkau (1962), p.233; placed to genus *Conchapelopia*

melanops (Wiedemann, 1818) Syst. Beschr.,1,65, 18; Europe.

Tokunaga (1937a), p.51; *Pentaneura melanops* Meigen; M.F.; Kibune and Kurama (Kyoto)

Tokunaga (1937b), p.94; *Pentaneura*; M.F.

Fittkau (1957), p.233; gave a new name, *Conchapelopia quatuormaculata*, to Tokunaga's *melanops* Meigen

Sasa (1988a); *Conchapelopia*; M.; Lake Shikotsu (Hokkaido)

multifascia Tokunaga, 1937; Philipp. J. Sci.,**62**,54; *Pentaneura*; M.;type loc. Nagaoka (Kyoto); also at Kitashirakawa and Nishigamo (Kyoto)

Tokunaga (1937b), p.89; *Pentaneura*; M.

Fittkau (1962), p.233; placed *multifasciata* (? misprint of *multifascia*) Tokunaga 1937 to *Conchapelopia*

3. Genus ***Krenopelopia*** Fittkau, 1962

alba (Tokunaga, 1937a); Philipp. J. Sci.,**62**,49; *Pentaneura*; M.; type loc. Mount Atago (Kyoto); collected also at Kurama and Kibune (Kyoto), and Iyayama (Tokushima)

Tokunaga (1937b), p.93; *Pentaneura*; M.F.

Fittkau (1962), p.274; transferred to genus *Krenopelopia* Fittkau

yunouresia sp. nov.; M.F.; type loc. Lake Yunoko, Nikko (Tochigi); (see Part 3 of this paper)

4. Genus ***Nilotanypus*** Kieffer, 1923

minutus (Tokunaga, 1937); Philipp. J. Sci.,**62**,43; M.F.; *Pentaneura*; type loc. Kibune (Kyoto); also at Uzumasa (Kyoto)

Tokunaga (1937b), p.86; M.F.

Fittkau (1962), p.415; placed to genus *Nilotanypus* Kieffer, 1923

5. Genus ***Paramerina*** Fittkau, 1962

divisa (Walker, 1856); Ins. Britan.,**3**,201; Europe

Tokunaga (1937a), p.53; (1937b), p.97; *Pentaneura*; M.; Gotemba (Shizuoka)

Fittkau (1962), p.327; treated this species as (?) *Paramerina divisa* Tokunaga, 1937

Sasa & Hasegawa (1988), p.252; M.F.; Lake Ryutan, Shuri (Okinawa)

6. Genus ***Rheopelopia*** Fittkau, 1962

maculipennis (Zetterstedt, 1838); Dipt. Scand. Sec. 3, Diptera;818

Tokunaga (1937a), p.48; *Pentaneura*; M.F.; Shimogamo, Hachijo, Arashiyama, Kibune, Kitashirakawa, Yamashina and Nishigamo (Kyoto), Mount Ryozen (Mie)

Tokunaga (1937b), p.91; M.F.

Note: This species was regarded as a synonym of *P. laeta* (Meigen, 1818) by Goetghebuer (1936, p.34), but Fittkau (1962, p.217) recognized it as a valid species, and placed it to genus *Rheopelopia* Fittkau, 1962. Fittkau (1962, p.216) quoted Tokunaga's record from Japan as "(?) *Rh. maculipennis* (Tokunaga)."

7. Genus ***Trissopelopia*** Kieffer, 1923

oyabetrispinosa Sasa, Kawai et Ueno, 1988; Res. Rep. Toyama Pref. Environ. Pollut. Res. Cent., 1988, p.59; M.; type loc. Lake Tohri (Toyama)

8. Genus ***Zavrelimyia*** Fittkau, 1962

monticola (Tokunaga, 1937); Philipp. J. Sci.,**62**,47; M.; *Pentaneura;* type loc. Ashiu, (Kyoto)

Tokunaga (1937b), p.99; M.

Fittkau (1962), p.314; transferred to genus *Zavrelimyia* Fittkau 1962

9. Unplaced species of tribe **PENTANEURINI**

The following species were described by Tokunaga (1937-1940), all as members of the genus *Pentaneura* Philippi, 1865, but their generic status is unceertain at the present stage.

circumdata Tokunaga, 1940; Philipp. J. Sci.,**72**,283; F.; type loc. Sizyukei (Taiwan)

esakii (Tokunaga, 1939); Philipp. J. Sci.,**69**,301; M.F.; type loc. Miure, Otaki-mura (Nagano)

fusciclava (Kieffer, 1922); *Tanypus*; Ann. Soc. Linn. Lyon,**69**,40; F.; Daitotei (Taiwan)
Tokunaga (1937a), p.48; (1937b), p.91; *Pentaneura*; F.;

gracillima (Kieffer, 1916); *Pelopia*; Ann. Mus. Nat. Hung., **14**,102; M.; Takao (Taiwan)
Tokunaga (1937a), p.55; (1937b), p.100; *Pentaneura*; M.;

japonica Tokunaga, 1937; Philipp. J. Sci.,**62**,50; F.; type loc. Arashiyama (Kyoto); also at Kitashirakawa (Kyoto)
Tokunaga (1937b), p.94; F.
Sasa (1988a), p.53; F.; Lake Toya (Hokkaido)

kyotoensis Tokunaga, 1937; Philipp. J. Sci.,**62**,53; M.; type loc. Uzumasa (Kyoto)
Tokunaga (1937b), p.98; M.

longipennis Tokunaga, 1937; Philipp. J. Sci.,**62**,52; type loc. Kibune (Kyoto); also at Kurama (Kyoto)
Tokunaga (1937b), p.98; M.

octopunctata Tokunaga, 1937; Philipp. J. Sci.,**62**,46; type loc. Hachijo (Kyoto)

okadai Tokunaga, 1938; Philipp. J. Sci., **65**,351; M.F.; type loc. Yunomine-onsen (Wakayama); collected from a hotspring

pleuralis Tokunaga, 1940; Philipp. J. Sci.,**72**,284; M.F.; type loc. Sizyukei (Taiwan)

DD. Tribe **TANYPODINI**

1. Genus ***Tanypus*** Meigen, 1803

punctipennis Meigen, 1818; Syst. Beschr.
Tokunaga (1937a), p.33; M.F.; Karo (Tottori), Toba (Mie), in July and August, Taihoku (Taiwan) in November
Tokunaga (1937b), p.76; M.F.
Sasa & Kawai (1987a), p.60; Lake Biwa (Shiga)

Part 2. Provisional Key to Males of Japanese Chironomidae

(This key largely followed the system proposed by Pinder, 1978 and was compiled by assistance of Mr. R. Ueno, NIES)

Key to subfamilies

1 - Cross vein m-cu present **2**
- Cross vein m-cu absent **4**

2 - Last antennal segment very short, the penultimate segment is longest; vein R2+3 present and forked, or absent; wing usually with macrotrichiae, rarely bare **3**
- Last antennal segment much longer than any of the preceding segments; vein R2+3 simple; wing usually without macrotrichiae **DIAMESINAE (C) P.137**

3 - Vein R2+3 absent, R1 and R4+5 well separated *** PODONOMINAE**
- Vein R2+3 present and forked, or absent; R1 and R4+5 in close proximity **TANYPODINAE (D) P.141**

4 - Front tarsus I shorter than front tibia (fLR smaller than 1); gonostylus usually bent inwards and with a subapical spine; front tibia with one long terminal spur, middle tibia with two short terminal spurs, and hind tibia with a long and a short terminal spurs and a terminal comb composed of free spurs in most species **ORTHOCLADIINAE (B) P.109**
- Front tarsus I longer than front tibia (fLR larger than 1); gonostylus directed backwards parallel to the body axis and without terminal spur; tibiae without such terminal spurs, middle and hind tibiae usually with terminal scales composed of fused spurs **CHIRONOMINAE (A) P.73**

A. Subfamily CHIRONOMINAE

Key to the Tribes

1 - Cross vein r-m short and almost parallel to wing axis; wing membrane with macrotrichiae (excepting *Biwatendipes* and some marine *Tanytarsus*); squama bare; hypopygium usually with median appendage **Tribe TANYTARSINI P.96**
- Cross vein r-m longer and oblique to wing axis; wing membrane usually bare, rarely with macrotrichiae; squama usually fringed, rarely bare; hypopygium rarely with median appendage **Tribe CHIRONOMINI P.73**

AA. Tribe CHIRONOMINI

Key to the complexes

1 - Antenna with 11 flagellar segments; both combs of middle and hind tibiae usually with a short spur; front tibia with a low and rounded terminal scale; ventral appendage without a long terminal seta **2**

- Antenna with 13 flagellar segments; one comb of middle and hind tibiae with a long spur and the other comb without spur (or if both combs with a spur, then front tibia with a distinctly projecting triangular terminal scale); ventral appendage often with a long, caudally directed terminal seta **the *Polypedilum* complex P.84**

2 - Both dorsal and ventral appendages well developed, the latter extending beyond tip of gonocoxite and often bearing many strong, curved setae **the *Chironomus* complex P.74**

- Both dorsal and ventral appendages highly reduced or pad-like, sometimes absent, the latter, even when present, not reaching to tip of gonocoxite and without strong curved setae **the *Harnischia* complex P.80**

AA (A). The ***Chironomus*** complex of tribe **CHIRONOMINI**

(Antenna composed of a pedicel and 11 flagellar segments; both dorsal and ventral appendages well developed)

1 - Antepronotum well developed, thickly united in the middle 2

- Antepronotum reduced towards middle or deeply separated medially; dorsal appendage slender and abruptly hooked apically (6 spp.) ***Glyptotendipes* Kieffer P.79**

2 - Dorsal appendage with a few to numerous setae on the apical portion 3

- Dorsal appendage either entirely bare, or with setae only on the basal portion 4

3 - Dorsal appendage finger-like and often with an apical hook, with a few medially directed setae subapically, and without basal expansion bearing long setae; ventral appendage usually very long and bearing a few simple apical setae (10 spp.) ***Dicroptendipes* Kieffer P.78**

- Dorsal appendage plate-like, with numerous setae on distal half; ventral appendage like in *Chironomus*, shorter, finger-like and with numerous recurved setae on the distal portion (1 sp.) ***Chaetolabis* Townes P.75**

4 - Ninth tergite with a prominent process on each sides of anal point; ventral appendage long and with numerous setae on entire length; dorsal appendage reduced to a small plate (1 sp.) ***Camptochironomus* Kieffer P.75**

- Ninth tergite without processes flanking anal point; dorsal appendage well developed 5

5 - Ventral appendage very long and often bulbous, reaching to near tip of gonostylus, and bearing numerous setae on distal half or along its entire length 6

- Ventral appendage shorter and not reaching to middle of gonostylus, bearing recurved setae on apical portion only; dorsal appendage composed of a broad base bearing long setae and microtrichiae, and a bare distal blade 8

6 - Dorsal appendage is a simple plate, either entirely bare or with short setae; anal point short and broad (2 spp.) ***Carteronica* Strand P.75**

- Dorsal appendage horn-like apically and with long setae on the basal portion; anal point narrow and basally constricted **7**

7 - Mouth parts highly reduced, palpi much shorter than the width of head (1 sp.) ***Nilodorum* Kieffer P.80**

- Mouth parts and palpi well developed, palpi as long as or longer than width of head (2 spp.) ***Kiefferulus* Goetghebuer P.80**

8 - Dorsal appendage composed of a high, stout and setigerous basal portion occupying more than half of its length and bearing numerous setae, and a bare horn-like distal blade (3 spp.) ***Einfeldia* Kieffer P.79**

- Dorsal appendage composed of a low and broad basal portion, and a long, bare and horn-like distal blade (19 spp.) ***Chironomus* Meigen P.75**

1. Genus ***Camptochironomus*** Kieffer, 1918

One species, ***biwaprimus* Sasa et Kawai, 1987,** was recorded from Japan; WL 3.58-4.05 mm; body with peculiar coloration especially on legs, with dark brown marks on yellow; AR 3.17-3.89, PN 0, DM 6-14, DL 19-36, PA 6-10, SC 24-36, fLR 1.34-1.58, fBR 1.2-2.1; dorsal appendage a small highly setigerous plate.

2. Genus ***Carteronica*** Strand, 1928

1 - Gonostylus nearly globular, widest at about middle; anal point not laterally expanded; WL 1.94-2.24 mm, AR 1.90-2.10, fLR 1.74-1.77, PN 0; larvae were collected from concrete pool containing sea water in Okinawa (after Sasa & Hasegawa, 1983) ***longilobus* (Kieffer)**

- Gonostylus almost conical, widest at base; anal point with a pair of lateral expansions; WL 2.59-3.11mm, AR 1.60-1.92, fLR 1.49-1.67, PN 6-9; larvae were collected from eutrophicated ground pool in Okinawa (after Sasa & Hasegawa, 1983) ***crassiforceps* (Kieffer)**

3. Genus ***Chaetolabis*** Townes, 1945

One species, ***macani* Freeman,** was recorded from Japan by Yamamoto, 1987. WL 4.3-4.7 mm, AR 4.12-4.67, PN 0, DM 16, DL 32-38, PA 7-10, SC 41-51, fLR 1.36-1.41

4. Genus ***Chironomus*** Meigen, 1803

1 - Anal point short and stout, widest at base; antepronotum without lateral seta **2**

- Anal point narrow and long, either parallel-sided or constricted at base **3**

2 - Large black species; WL 3.67-4.74 mm; abdominal tergites II to IV with a pale apical band; dorsal appendage almost straight and parallel-sided but abruptly curved at apex like a hook; WL 3.67-4.74 mm, AR 3.24-4.10, fLR 1.34-1.56, fBR 1.8-2.5 (after Sasa, 1984) ***nipponensis* Tokunaga**

- Medium-sized greenish yellow species; WL 2.25-2.81 mm; scutal stripes brown,

abdominal tergites II to IV with a basal brown portion and a narrow apical yellow band; dorsal appendage horn-like, inner margin concave and tapering towards pointed apex; AR 3.19-3.51, fLR 1.67-1.81, fBR 2.6-3.4 (after Sasa, 1985c) ***fujitertius*** **Sasa**

2 - Wing with cloudy marks; basal setigerous portion of dorsal appendage relatively high (near the *Einfeldia* type), the distal blade horn-like, smoothly curved and apically pointed; antepronotum with 5-12 lateral setae; WL 2.76-2.86 mm, AR 2.79-3.28, fLR 1.55-1.73 (after Sasa & Hasegawa, 1983) ***kiiensis*** **Tokunaga**

\- Wing without cloudy marks; basal expansion of dorsal appendage lower or narrower; antepronotum without lateral seta 3

3 - Dorsal appendage boot-shaped (S-form of Strenzke, 1959), *i.e.* expanded in the middle and bent rectangularly inwards 4

\- Dorsal appendage either band-like (straight and parallel-sided, B-type of Strenzke, 1959), or horn-like (slender and slightly curved inwards, E-type of Strenzke, 1959) 7

4 - Body greenish yellow with dark marks 5

\- Body almost entirely black; WL 3.30-3.60 mm, AR 2.43-3.13, fLR 1.36-1.43, fBR 1.5-2.7, fTR 0.25-0.26 (after Sasa, 1978) ***acerbiphilus*** **Tokunaga**

5 - Scutal stripes black, abdomen uniformly brown; AR about 3.5, fLR about 1.5, beards of forelegs absent (after Tokunaga, 1939) ***trinigrivittatus*** **Tokunaga**

\- Scutal stripes brown or reddish brown, abdominal tergites with brown marks on greenish yellow ground 6

6 - Dark marks on abdominal tergites II to IV narrow transverse bands; AR about 3.0, fLR about 1.6, fTR about 0.26, fBR about 2.1; larvae commonly found in eutrophicated streams all over Japan excepting Okinawa ***yoshimatsui*** **Martin et Sublette**

\- Dark marks on abdominal tergites II to IV elongate oval; WL 2.26-3.28 mm, AR 2.80-3.34, PN 0, DM 18-25, DL 19-37, SC 17-28, fLR 1.59-1.77, fTR 0.38-0.40 (significantly larger), fBR 1.8-2.6; larvae in eutrophicated and stagnant waters (after Sasa & Hasegawa, 1983) ***samoensis*** **Edwards** (= *flaviplumus* Tokunaga)

6 - Dorsal appendage broad, parallel-sided and apically truncate (B-form); abdominal tergites II to IV each with a broad basal dark band of V-shaped posterior margin; AR 3.1, fLR 1.8, fBR 2.1 ***nippodorsalis*** **Sasa**

\- Dorsal appendage narrower, tapering towards apex, usually curved inwards and with pointed or hooked apex (E-form) 8

8 - Large midge, WL 5.62-6.37 mm; AR 5.00-5.37, fLR 1.16-1.23, fTR 0.18-0.20, fBR 5.8-10.9; dorsal appendage almost straight and apically hooked; abdominal tergites yellow and with brown marks (light form), or almost uniformly black (after Sasa & Kamimura, 1987) ***plumosus*** **(Linnaeus)**

\- Smaller midge with wing length less than 4.0 mm; dorsal appendage with concave inner margin 9

9 - Margins of median and lateral stripes of scutum conspicuously darker than the middle portions; WL 2.75-3.44 mm, AR 3.75-4.00, fLR 1.55-1.64, fTR 0.29-

0.31, fBR 1.9-2.4 (after Sasa & Hasegawa, 1983)

***circumdatus* Kieffer**

- Scutal stripes almost uniform in color **10**

10- Body almost uniformly dark brown, abdominal tergites without dark or light marks; WL 3.78-4.12 mm, AR 3.65-4.02, fLR 1.30-1.36, fTR 0.22-0.23, fBR 3.7-4.2 (after Sasa, 1988b) ***salinarius* Kieffer**

- Body with dark and light marks, or entirely greenish yellow **11**

11- Abdominal tergites II to IV each with a large triangular dark mark; WL 2.50-3.01 mm, AR 3.07-3.51, fLR 1.49-1.56, fTR 0.31-0.36, fBR 2.3-2.6 (after Sasa & Hasegawa, 1983) ***okinawanus* Hasegawa et Sasa**

- Abdominal tergites without such conspicuous dark marks **12**

12- Front tarsus IV longer than III; abdominal tergites almost uniformly pale yellow; ventral appendage short and stout; WL 2.86-3.08 mm, AR 3.00-3.46, fLR 1.65-1.74, fTR 0.33-0.37, fBR 2.1-2.5 (after Sasa & Hasegawa, 1983)

***javanus* (Kieffer)**

- Front tarsus IV shorter than III; ventral appendage more slender **13**

13- Gonostylus abruptly constricted in the middle; dorsal appendage smoothly curved; AR 3, fLR 1.5-1.6; larvae in tide pools (after Tokunaga, 1936)

***setonis* Tokunaga**

- Gonostylus almost parallel-sided towards apex; dorsal appendage almost straight in basal portion, abruptly curved near apex; WL 3.26-3.63 mm, AR 3.19-3.88, fLR 1.41-1.53, fTR 0.20-0.22, fBR 1.9-2.4; larvae from fresh water lakes (after Sasa, 1985c) ***fujiprimus* Sasa**

Note: *nomina dubia* among *Chironomus* recorded from this region.

1 . *Chironomus prassinellus* Kieffer, 1912, was recorded also from Taiwan by Tokunaga (1940) without giving figures. and since the original description of Kieffer is also very poor and incomplete, this name is treated as *nomen dubium.*

2 . *Chironomus lugubris* Zetterstedt was recorded and illustrated by Tokunaga (1938a) from hotspring water of Unzen (Nagasaki). The shape of dorsal appendage in his Fig.27 *b* (p.323) looks like that of *Einfeldia*. This species in Europe has a boot-shaped (S-form) dorsal appendage. On the other hand, the present author has collected large numbers of *Chironomus* from apparently the same sulphuric stream in Unzen, which also has a S-form dorsal appendage and could not be differentiated morphologically from *C. acerbiphilus* Tokunaga 1939. Therefore, this species is also treated here as *nomen dubium.*

3 . *Chironomus thummi* Kieffer was recorded by Tokunaga (1940) also from a hotspring of Zigoku-onsen (Kumamoto). This trivial name is apparently a misprint of *thummi*, and Martin & Sublette (1972) recognized it as a synonym of *C. riparius* (Meigen). According to Tokunaga (1940, p.291), this is again a black species with hypopygium similar to his *Chironomus dorsalis* (also with S-form dorsal appendage), and cannot be differentiated from *acerbiphilus.*

4 . *Chironomus basitibialis* Tokunaga, 1936 (Philip. J. Sci., **60**, 81), which was described by male and female collected at Seto (Wakayama), closely resembles to *Chironomus circumdatus* (Kieffer, 1916) of Hashimoto (1977), Sasa (1978) and Sasa & Hasegawa (1983), and needs to be clarified of its status.

5. Genus *Dicrotendipes* Kieffer, 1913
(=*Limnochironomus* Kieffer, 1923; =*Kimius* Ree, 1981)

1 - Ventral appendage apically forked into two arms, both bearing bristles; wing with 6 dark marks; WL 2.21-2.42 (2.28), AR 2.59-2.97, fLR 1.46-1.54, fTR 0.24-0.26, fBR 2.1-3.0; frontal tubercles prominent; body pale yellow, stripes reddish brown, femur, tibia, tarsi I and II of front leg with an apical dark ring (after Sasa & Hasegawa, 1983)
septemmaculatus Becker (=*formosanus* Kieffer)

\- Ventral appendage not forked apically; wing without dark marks 2

2 - Anal point very wide and short, strongly bent ventrad; dorsal appendage short and apically rounded, with a few setae on inner side near apex; ventral appendage also short, almost straight; body entirely black; WL 2.08-2.45, AR 2.33-2.66, fLR 1.65-1.81, fBR 2.4-4.1; collected from eutrophicated freshwater pools (after Sasa & Hasegawa, 1983)
pelochloris (Kieffer)=*niveicaudus* (Kieffer)

\- Anal point narrow, slender and often constricted at base 3

3 - Dorsal appendage short, hardly extending beyond tip of gonocoxite, entirely covered with microtrichiae, with a few subapical seta, and a conspicuous apical hook; ventral appendage also relatively short, finger-like and with numerous recurved setae in the distal portion; collected from tide pools 4

\- Dorsal appendages without microtrichiae; ventral appendage with only a few subapical setae; collected from freshwater or brackish water pools 5

4 - Ninth tergite with more than 10 setae in the middle portion; ventral appendage with 2 or 3 straight apical setae besides strong, recurved setae; dorsal appendage longer, gonostylus stouter (after Tokunaga, 1936b)
enteromorphae var. _pacificus_ Tokunaga

\- Ninth tergite with some 4 setae in the middle portion; ventral appendage without straight apical setae; dorsal appendage shorter, gonostylus narrower (after Tokunaga, 1936b)
enteromorphae enteromorphae Tokunaga

5 - Ventral appendage long, slender and strongly curved; gonostylus long, slender and almost parallel-sided along its entire length 6

\- Ventral appendage shorter and stouter, and almost straight; gonostylus shorter, stouter and widest at about middle 8

6 - Dorsal appendage twisted like figure S, apical half expanded and bare laterally, with several short setae on inner side; WL 2.09, AR 2.47, fLR 1.82, fBR 2.2 (after Sasa, 1981) **_tamaviridis_ Sasa**

\- Dorsal appendage almost straight, slightly expanded and hooked apically, with a few short setae arising in apical portion 7

7 - Anal point short and stout, darkly pigmented, appendages and gonostylus paler in color than anal point; setae on ventral appendage and apical seta on gonostylus long and stout; WL 2.10-2.14, AR 2.19-2.64, DM 10, DL 10-14, SC 10, SQ 5-9 (after Sasa, 1985b,c) **_flexus_ (Johannsen)**

\- Anal point longer, more slender and only slightly pigmented, appendages and

gonostylus darker than anal point; setae on ventral appendage shorter and thinner, terminal spur of gonostylus minute; WL 2.84-2.79, AR 2.24-2.75, fLR 1.65, BR 2.3 (after Sasa & Kikuchi, 1985)

***nervosus* (Staeger)**

8 - Subapical setae of dorsal appendage long, several times as long as the diameter of shaft; anal point strongly constricted at base; WL 1.94-2.27, AR 2.22-2.38, fLR 1.60-1.76, fB 2.2-2.8 ***yaeyamanus* Hasegawa et Sasa**

- Subapical setae of dorsal appendage shorter, almost as long as diameter of the shaft; anal point only slightly constricted basally **9**

9 - Dorsal appendage almost straight, apically rounded and with a small beak-like process; WL 2.52-3.07, AR 2.29-2.62, fLR 1.48-1.65, fBR 2.3-3.3 (after Sasa, 1984) ***lobiger* (Kieffer)**

- Dorsal appendage curved laterally on apical portion, and hooked apically; AR about 2.5, fLR 1.5-1.7; larva breeding in brackish water

***inouei* Hashimoto**

6. Genus ***Einfeldia*** Kieffer, 1924

(Base of dorsal appendage high and setigerous, other characters similar to *Chironomus* s. str.)

1 - Anal point very broad, nearly parallel-sided and with rounded apex

***pagana*(Meigen)**

- Anal point narrow and constricted near base **2**

2 - Body entirely dark brown or black, anal point black; WL 2.75-3.05, AR 2.71-2.78, fLR 1.71-1.77, fTR 0.27-0.28, fBR 2.8-3.2; DM 0, DL 11-20 (after Sasa & Hasegawa, 1983) ***dissidens* (Walker)**

- Ground color of scutum yellowish, scutal stripes brown, abdominal tergites with brown bands, anal point weakly chitinized ***dorsalis* Meigen**

7. Genus ***Glyptotendipes*** Kieffer, 1913

(Antepronotum highly reduced in the middle and widely separated from each other; other characters similar to *Chironomus* s. str.)

1 - Abdominal tergites without racket-like impressions; R2+3 almost fused with R1; body largely pale yellow **Subgenus *Glyptotendipes* s. str.** **2**

- Abdominal tergites II to VI each with a large racket-like impression corresponding to the scale on pupal skin; R2+3 separeted from R1; body largely brown or black **Subgenus *Phytotendipes* Goetghebuer** **4**

2 - Tarsi with long beards, fBR 4.0-6.2; dorsal appendage strongly and smoothly curved like figure C, and with rounded apex; anal point long, slender and slightly expanded apically; WL 2.60-2.76 mm, AR 3.04-3.40, fLR 1.25-1.35; (after Sasa, 1985c) ***fujisecundus* (Sasa)**

- Tarsi without long beards; distal blade of dorsal appendage almost straight and apically hooked **3**

3 - Dorsal appendage composed of a low setigerous base, and a long, straight and

apically hooked distal blade; anal point long, slender and constricted basally; WL 3.53±0.09 mm, AR 3.76±0.18, fLR 1.36±0.02 (after Ree & Kim, 1981) ***goryoense* Ree et Kim**

- Dorsal appendage composed of a high, setigerous base and a smoothly curved distal blade (*Einfeldia*-type); anal point short and highly constricted basally; AR 2.61, fLR 1.26, fBR 1.5; scutum yellow, scutal stripes reddish brown (after Sasa & Kawai, 1987) ***biwasecundus* Sasa et Kawai**

4 - Scutum yellowish brown, stripes dark brown, abdomen dark brown, each tergite with a pale band along caudal margin; leg segments largely yellowish brown, knee parts broadly dark brown, tarsal segments dark at tip; frontal tubercles absent; fLR 1.6-1.7, AR 3.35-3.42, front tarsi without beards (after Tokunaga, 1940, p.298); anal point long and slender (after Pinder, 1978, p.124) ***gripekoveni* (Kieffer)**

- Body almost entirely black; frontal tubercles present; anal point shorter and more broadened apically **5**

5 - AR about 4.6, fLR about 1.35; frontal tubercles small (after Tokunaga, 1940); anal point broadest medially, not clubbed (after Pinder, 1978) ***paripes* (Edwards)**

- AR 3.23-3.59, fLR 1.43-1.50; fore legs without long beards, BR 2.1-2.3; tarsi II longer than tarsi III in all legs; frontal tubercles conspicuous; anal point clubbed distally (after Sasa & Hasegawa, 1983, p.319) ***tokunagai* Sasa**

8. Genus ***Kiefferulus*** Goetghebuer, 1922

1 - Dorsal appendage composed of a circular basal portion bearing some 10 very long inner setae, and a narrow, curved and apically pointed distal blade; WL 2.65-2.89 mm, AR 2.71-3.07, PN 0, DM 6-10. DL 4-8f, LR 1.44-1.57, fBR 1.2-1.8 (after Sasa & Hasegawa, 1983) ***glauciventris* (Kieffer)**

- Dorsal appendage horn-like and without basal expansion, with more than 10 inner setae on basal half; WL 3.0-3.8, AR 2.82-3.13, fLR 1.56-1.71 (after Yamamoto, 1979) ***umbraticola* (Yamamoto)**

9. Genus ***Nilodorum*** Kieffer, 1921

One species, ***tainanus* (Kieffer, 1912)** is recorded. WL 2.34-2.86 mm, AR 4.00-4.48, PN o, DM 21-32, DL 10-14, PA 6-11, SC 8-16, fLR 1.18-1.31, fBR 2.9-4.7 (after Sasa & Hasegawa, 1983)

AA(B). The ***Harnischia*** complex of Tribe **CHIRONOMINI**

(Both dorsal and ventral apendages of male hypopygium highly reduced or absent; eyes and wings bare; both combs of hind tibia with a spur; pulvilli well-developed; antepronotum united in the middle)

1 - Dorsal appendage rod-like and bearing a few apical setae **2**

- Dorsal appendage short, broad and pubescent pad, or absent **4**

2 - Ventral appendage in the form of a pubescent pad (2 spp.) ***Parachironomus* Lenz P.84**

- Ventral appendage absent **3**

3 - Gonostylus long, strongly incurved, swollen basally and with an apical tooth; ninth tergite with a pair of broad tubercles bearing setae on each side of anal point (3 spp.) ***Microchironomus* Kieffer P.83**

- Gonostylus long and incurved but not much swollen basally, without an apical tooth; ninth tergite without processes flanking anal point (3 spp.) ***Cryptotendipes* Lenz P.82**

4 - Ventral appendage in the form of a small pubescent pad; dorsal appendage short and broad, densely pubescent, with a few long setae (2 spp.) ***Paracladopelma* Harnisch P.84**

- Appendages not as above **5**

5 - Gonostylus short and broad; dorsal appendage short, broad and pubescent; ventral appendage also small, with a few setae but without microtrichiae (5 spp.) ***Cryptochironomus* Kieffer P.81**

- Gonostylus longer; dorsal appendage strongly reduced or absent **6**

6 - Gonostylus with a dorsal keel (1 sp.) ***Demicryptochironomus* Lenz P.83**

- Gonostylus without a dorsal keel **7**

7 - Gonostylus of uniform thickness or gently tapered from base to tip (3 spp.) ***Harnischia* Kieffer P.83**

- Gonostylus of varying thickness and abruptly curved in distal half (1 sp.) ***Cladopelma* Kieffer P.81**

1. Genus *Cladopelma* Kieffer, 1921
(= *Cryptocladopelma* Lenz)

(Dorsal appendage highly reduced and covered with microtrichiae; ventral appendage absent; gonostylus abruptly curved inwards at about middle)

***Chironomus* (*Cryptochironomus*) *viridulus* (Fabricius)** was recorded by Tokunaga (1940) from Sakhalin; body yellow in ground color, scutal stripes black, abdomen brown; AR about 2.5, fLR about 1.6; hypopygioum without dorsal and ventral appendages, anal point triangular.

Another species which is probably coincident with ***Cladopelma viridula* (Linnaeus)** of various authors in Europe was recorded from South Japan, by Sasa & Hasegawa (1983) from Okinawa, and by Sasa (1985c) from Kagoshima, in which body is also largely greenish yellow, stripes reddish brown, AR 2.00-2.21, fLR 1.70-1.79, anal point is stout, parallel-sided and with lateral setae, ventral appendage is absent but dorsal appendage is present, small pubescent pad bearing a long seta.

2. Genus *Cryptochironomus* Kieffer, 1918

(both dorsal and ventral appendages short, broad and pubescent; gonostylus short and broad)

1 - Anal point stout and almost parallel-sided; dorsal appendage finger-like and about 4 times as long as wide; inner margin of gonostylus almost straight; frontal tubercles minute; scutal stripes, postnotum and hypopygium dark brown, other body parts brown, darker in general than the other species; WL 2.22, AR 2.44, fLR 1.89, fBR 2.9 (after Sasa & Hasegawa, 1983)

javae **Kieffer**

\- Anal point long and slender; dorsal appendage shorter and broader, at most twice as long as wide; body largely yellow, with scutal stripes and postnotum brown **2**

2 - Gonostylus widest at base and tapering towards apex; dorsal appendage about twice as long as wide and with 3 or 4 long setae; ventral appendage extending much beyond posterior margin of dorsal appendage; frontal tubercles large, about twice as long as wide; WL 2.52-2.71 mm, fLR 1.61-1.63, fBR 1.8-2.2 (after Sasa & Ichimori, 1983)

tamayoroi **Sasa et Ichimori**

\- Gonostylus widest at about middle; dorsal appendage wider than long; ventral appendage small and largely hidden behind dorsal appendage **3**

3 - Dorsal appendage with only one long seta on posterior margin; anal point very long, narrow and slender; gonostylus abruptly narrowed near apex and apically pointed; bands of ninth tergete united in the middle; frontal tubercles small, wider than long; WL 2.20-2.60 mm, AR 2.60-2.74, fLR 1.65-1.78, fBR 1.2-1.8 (after Sasa & Kawai, 1987a; annex)

tamaichimori **Sasa**

\- Dorsal appendage with 3-5 long setae; anal point wider; gonostylus not abruptly narrowed near apex; bands of ninth tergite separated in the middle and connected with a bridge, like figure H; frontal tubercles large, longer than wide **4**

4 - Gonostylus very stout and short, with rounded apex; bands of ninth tergite widely separated; WL 2.19-2.70 mm, AR 2.82-3.28, fLR 1.47-1.62; tarsi without long beards, fBR 1.5-3.1 (after Sasa & Hasegawa, 1983)

hentonensis **Hasegawa et Sasa**

\- Gonostylus more slender, tapering towards pointed apex; bands of ninth tergite narrowly separated; WL 2.09-2.50 mm, AR 2.59-3.09, fLR 1.50-1.81, tarsi with long beards, fBR 3.4-4.4 (after Sasa & Kawai, 1987a)

albofasciatus **(Staeger)**

3. Genus ***Cryptotendipes*** Lenz, 1941

(Dorsal appendage rod-like and bearing a few apical setae; ventral appendage absent; gonostylus long, incurved and without apical tooth)

1 - Dorsal appendage long and finger-like, much exceeding beyond tip of gonocoxite; WL 1.76 mm, AR 2.30, fLR 2.09, fBR 2.7

oyabeprimus **Sasa et al.**

\- Dorsal appendage much shorter, apex not reaching to tip of gonocoxite **2**

2 - Anal point long, slender and apically pointed; posterior margin of ninth tergite

forming an acute angle in the middle; dorsal appendage longer, about three times as long as wide; WL 2.10 mm, AR 2.20, fLR 2.88, fBR 2.6 (after Sasa, 1983) ***tamacutus* Sasa**

- Anal point stout and apically rounded; posterior margin of ninth tergite flat, not forming an angle in the middle; dorsal appendage very small and about twice as long as wide; WL 1.38-1.62 mm, AR 1.83-2.11, fLR 1.79-1.90, fBR 2.7-4.6 (after Sasa, 1985c) ***fujiquartus* Sasa**

4. Genus *Demicryptochironomus* Lenz, 1941

(Both dorsal and ventral appendages highly reduced; gonostylus with a longitudinal keel)

One species, ***chuzequartus***, Sasa, 1984, is recorded.

5. Genus *Harnischia* Kieffer, 1921

(Both dorsal and ventral appendages highly reduced or absent; gonostylus slender, almost parallel-sided and gently curved, without keel)

1 - Gonostylus truncate apically; gonocoxite with a large mesal lobe but both dorsal and ventral apendages absent; frontal tubercles absent; scutum pale green, with yellowish brown stripes, abdominal tergites I-V green, VI-VIII brown; AR 2.0-2.5, fLR 2.0-2.5 (after Hashimoto, 1984) ***japonica* Hashimoto**

- Gonostylus rounded or pointed apically; at least dorsal appendage present; frontal tubercles present, though minute **2**

2 - Gonostylus widest at base and tapering towards pointed apex; both dorsal and ventral appendages present, though minute; body largely yellow, front femur, tibia and tarsus I with dark rings; WL 1.67-1.93 mm, AR 2.00-2.09, fLR 1.74-1.83 (after Sasa & Hasegawa, 1983) ***acuta* (Goetghebuer)**

- Gonostylus almost parallel-sided, inner margin slightly concave and with rounded apex; ventral appendage absent; body largely yellow, femora all yellow, front tibia and tarsi entirely dark brown; WL 1.76-1.93 mm, AR 2.09-2.39, fLR 1.66 (after Sasa & Kikuchi, 1986) ***curtilamellata* (Malloch)**

6. Genus *Microchironomus* Kieffer, 1918
(=*Leptochironomus* Pagast, 1931)

(Dorsal appendage rod-like and bearing a few apical setae; ventral appendage absent; gonostylus long, strongly incurved and swollen basally, with an apical tooth; ninth tergite with a pair of broad tubercles flanking anal point)

1 - Anal point short, broadest basally and tapering towards apex but often apically expanded; dorsal appendage bearing several setae, inclucluding 3 or 4

apical setae; WL 1.75-1.86mm, AR 2.29-2.45, fLR 1.28-1.32, fBR 1.62-2.5; abdominal tergites entirely yellow (after Sasa & Kawai, 1987a; annex) ***tabarui*** **Sasa**

- Anal point long, slender and almost parallel-sided or tapering towards apex; dorsal appendage bearing only one apical, and a few additional setae; AR smaller than 1.9 **2**

2 - Small midge with the wing length of 1.10-1.21 mm; body almost entirely greenish yellow, without conspicuous dark marks in prescutellar areas and on abdominal tergites; AR 1.42-1.59, fLR 1.79-1.92, fBR 1.7-2.7 (after Sasa & Kawai, 1987a) ***tener*** **(Kieffer)**

- Larger midge with wing length of 1.66-1.79 mm; body largely greenish yellow but with conspicuous dark brown marks on caudolateral corners of scutum, and in the center of abdominal tergites II to V; AR 1.62-1.85, fLR 1.61- 1.73 fBR 2.0-2.6 (after Sasa & Kawai, 1987a) ***ishiii*** **Sasa**

7. Genus *Parachironomus* Lenz, 1921

(dorsal appendage rod-like, with a few apical setae, otherwise bare; ventral appendage a small pubescent pad)

1 - Anal point long, slender and nearly parallel-sided; dorsal appendage short, finger-like, about 30 microns long and 15 microns in diameter, with two terminal setae; WL 2.04-2.45 mm, AR 2.49-3.00, fLR 1.46-1.53, fBR 2.7-3.0 (after Sasa, 1985c) ***arcuatus*** **Goetghebuer**

- Anal point constricted in the middle and swollen apically; dorsal appendage long, about 80 microns long and 20 microns in diameter, with a chitinized tooth subapically, and short setae in the middle and near apex; WL 1.65 mm, AR 1.67, fLR 2.04, tarsi without long beards (after Sasa, 1983) ***tamanipparai*** **(Sasa)**

8. Genus *Paracladopelma* Harnisch, 1923

(both dorsal and ventral appendages short, broad and pubescent pad)

1 - Anal point long, slender and nearly parallel-sided; WL 1.96-2.45 mm, AR 1.90-2.07, fLR 1.81-1.93, fBR 2.2-3.4 (after Sasa, 1985c) ***camptolabis*** **Kieffer**

- Anal point constricted in the middle and swollen apically; WL 1.77 mm, AR 1.41, fLR 2.04, tarsi without long beards (after Sasa, 1983) ***tamahikawai*** **Sasa**

AA(C). The *Polypedilum* complex of Tribe **CHIRONOMINI**

1 - Pulvilli absent or vestigial; squama usually bare **2**

- Pulvilli large and distinct; squama usually with fringe hairs **4**

2 - Ventral appendage very long, slender and strongly curved; ninth tergite with two

prominent processes besides anal point; dorsal appendage broad, padlike, with numerous microtrichiae and a long terminal seta; median appendage absent; front tibia with a long terminal spur (1 sp.)
***Nilothauma* Kieffer** **P.87**

- Ventral appendage shorter and stouter (the *Chironomus* type); ninth tergite without processes besides anal point; dorsal appendage bottle-shaped; median appendage present as in some *Tanytarsus* species **3**

3 - Front tibia with a terminal spur (1 sp.) ***Paratendipes* Kieffer** **P.87**

- Front tibia without terminal spur (1 sp.)
***Prochironomus* Kieffer** sensu Tokunaga (1940)

4 - Wing with macrotrichiae **5**

- Wing without macrotrichiae **7**

5 - Dorsal appendage roughly T-shaped, apically expanded both inwards and outwards, and with a terminal seta; ventral appendage with an apical tubercle bearing several setae; oral margin of eighth abdominal segment almost straight (1 sp.) ***Ainuyusurika* Sasa et Shirasaka** **P.86**

- Dorsal appendage roughly horn-shaped, tapering towards apex and without apical seta; ventral appendage without terminal tubercle **6**

6 - Oral margin of abdominal tergite VIII triangularly produced towards middle; one terminal comb of hind tibia with a long spur, the other comb without spur; gonostylus with several long setae along inner margin; AR smaller than 2.0 (8 spp.) ***Pentapedilum* Kieffer** **P.88**

- Abdominal tergite VIII nearly quadrangular, oral margin almost straight; both combs of posterior tibia with a short spur (occasionally one comb with a short spur, the other comb without spur); gonostylus without long inner setae except at tip; AR larger than 2.0 (3 spp.)
***Phaenopsectra* Kieffer** **P.89**

7 - Both combs of hind tibia with a short spur; antepronotum reduced in the middle, either widely separated or divided deeply into two anterior lobes **8**

- One comb of hind tibia with a long spur, the other comb without spur; antepronotum well developed, reaching to anterior margin of scutum and united in the middle **9**

8 - Ventral appendage very long, slender and curved, with only a few short setae but with a distinct terminal spine; antepronotum widely separated in the middle; wing membrane with distinct dark markings (6 spp.)
***Stenochironomus* Kieffer** **P.94**

- Ventral apendage stouter, shorter and with numerous strong recurved setae but without terminal spine; antepronotum extending to anterior edge of scutum but deeply divided into two anterior lobes; wing membrane without dark markings (2 spp.) ***Endochironomus* Kieffer** **P.86**

9 - Scutum with a small tubercle in the center; wing membrane with distinct dark markings (only one dark spot on r-m region in some species, several in others); legs usually distinctly ringed; gonostylus shorter than gonocoxite (5 spp.) ***Stictochironomus* Kieffer** **P.95**

- Scutum without a dorsal tubercle; wing membrane with or without dark marks; legs usually not ringed; gonostylus longer than gonocoxite **10**

10- Oral margin of abdominal tergite VIII triangularly produced towards middle; ventral appendage with a long, caudally directed terminal seta; vein R2+3 separated from R1 (except in the *cultellatum* group, in which both veins are closely set); dorsal appendage varying in shape and structure, but not as below (4 groups, 33 spp.) ***Polypedilum* Kieffer** **P.89**

- Oral margin of abdominal tergite VIII nearly straight; ventral apendage without long termianl seta; vein R2+3 almost fused with R1; dorsal appendage plate-like, with two to several setae in the middle and dorsal surface and often with one long seta at the base (6 spp.) ***Microtendipes* Kieffer** **P.86**

1. Genus *Ainuyusurika* Sasa et Shirasaka, 1988

A species formerly described as *Pentapedilum tuberculatum* (Tokunaga, 1940) was newly collected in Abasiri (Hokkaido), and new genus was created with this species as the genotype by Sasa (1988b). WL 1.62-2.20 mm, ER 0.15-0.27, AR 0.94-1.20, PN 0, DM 13-27, DL 8-16, PA 5-8, SC 9-14, RR 0.11-0.21, VR 1.29-1.42, R/Cu 1.11-1.17, fLR 1.13-1.29; frontal tubercles absent, legs with large pulvilli.

2. Genus *Endochironomus* Kieffer, 1918

1 - Abdomen largely dark brown or black; terminal scale of front tibia with rounded margin; terminal combs of middle tibia with only one spur, that of hind tibia fused and with two spurs; AR 2.8, fLR 1.2 (after Pinder, 1978, and Hashimoto, 1982) ***impar* (Walker)**

- Abdomen largely yellow, but tergites II to VII each with a conspicuous longitudinal dark stripe in the center; terminal scale of front tibia with a long, narrow and sharply pointed terminal scale; terminal combs of middle and hind tibiae both with a spur; WL 2.96 mm, AR 3.04, fLR 1.45, fTR 0.21, fBR 3.4 (after Sasa & Kawai, 1987a) ***pekanus* (Kieffer)**

3. Genus *Microtendipes* Kieffer, 1915

1 - Body largely white or pale yellow, scutal stripes yellow or reddish brown 2

- Thorax black or dark brown, stripes shining black, abdominal tergites I to VI yellow, VII to hypopygium dark brown **4**

2 - Ventral apendage with an apical setigerous tubercle, with 3 long terminal setae, and numerous recurved setae on inner side almost along entire length; dorsal appendage long, slender and curved, with 3 lateral setae in the middle and some 6 inner setae in the basal portion; body yellowish brown, scutal stripes reddish brown; fLR about 1.1, tarsi with long beards; body almost entirely yellow (after Tokunaga, 1940) ***yamasinensis* Tokunaga**

- Ventral appendage as usual, without terminal tubercle, without terminal seta, and with recurved setae on distal half only; dorsal appendage stouter; body entirely yellow or white; fLR 1.4-1.6; tarsi without long beards **3**

3 - Dorsal appendage broad basally and tapering towards pointed apex, with 3-5 (usually 4) lateral setae in the middle and a long inner seta at base arising from tubercle; ventral appendage tapering towards rather pointed apex; WL 1.45-1.70 mm, AR 1.26-1.45, fLR 1.47-1.56; body almost entirely pale yellow (after Kawai & Sasa, 1985) ***truncatus* Kawai et Sasa**

- Dorsal appendage narrow and horn-like, apically hooked, and with two short inner setae but without lateral seta; ventral appendage straight, with many setae on distal part only; R2+3 very close to R1; R4+5 ending almost at tip of wing; AR about 7(extremely high), fLR 1.4 (after Tokunaga, 1940) ***karafutonis* (Tokunaga)**

4 - Anal point triangular, pointed apically; dorsal appendage tapered towards apex, with one basal, seta, and 4 lateral setae; abdominal tergites I-V pale green, VI to hypopygium dark brown, front tibia dark brown, tarsi I and II yellow; WL 2.50-2.72 mm, AR 1.87-2.05, fLR 1.27-1.35, fBR 2.0 (after Sasa, 1980) ***britteni* (Edwards)**

- Anal point parallel-sided or weakly tapered, with rounded apex 5

5 - Dorsal appendage apically rounded, with 3 basal setae medially and 4 setae dorsally; scutum dark brown, abdominal tergites I-VI yellow, VIII and hypopygium brown, all femora largely yellow and with apical dark ring, front tibia with a broad basal dark ring, narrow apical dark ring and yellow between them, middle and hind tibiae largely yellow and with narrow basal and apical dark rings, all tarsi yellow; WL 2.19-2.45 mm, AR 1.98-2.16, PN 4-7, DM 0-8, fLR 1.25-1.34, fTR 0.24-0.26, fBR 2.0-2.3 (after Sasa, 1983) ***tamaogouti* Sasa**

- Dorsal appendage apically pointed and tapered, with only one basal seta medially, and 5 or more dorsal setae; abdominal tergites I-V yellow, VI to hypopygium dark brown, front tibia and tarsus I dark brown, other leg segments largely pale brown; WL 3.95 mm, AR 2.58, PN 3, DM 0, DL 10, PA 4, 5, SC 20, SQ 20, VR 1.13, fLR 1.16, fBR 2.9; R2+3 fused with R1 (after Sasa & Kamimura, 1987) ***chloris* (Meigen)**

4. Genus *Nilothauma* Kieffer, 1921

One species, ***brayi* (Goetghebuer, 1921)** was recorded by Sasa (1985b,c). WL 1.66-1.69 mm, AR 0.28 (extremely small), ER 0.04-0.06 (extremely small), PN 0, DM 16-18, DL 11-14, PA 3-5, SC only 2, fLR 1.44; frontal tubercles absent, squama bare.

5. Genus *Paratendipes* Kieffer, 1911

***tamayubai* Sasa, 1983** was recorded by Sasa (1983), Sasa & Kawai (1987a,b) and Sasa (1988a). Body dark brown, with black marks; WL 1.55-1.80 mm, AR 1.35-1.57, ER 0.28-0.34, PN 2-6, DM 7-10, DL 5-10, PA 2-4, SC 8-14, SQ 7-10. fLR 1.31-1.49, fBR 1.5-2.0.

6. Genus *Pentapedilum* Kieffer, 1913

1 - Dorsal appendage with a long lateral seta 2

- Dorsal appendage without lateral seta; body largely yellow, with brown scutal stripes, abdomen with brown marks on yellow ground color; WL 1.86 mm, AR 1.53; wing with macrotrichiae in extreme tip area only (after Sasa, 1988) ***utonaiprimum* Sasa**

2 - Anal point long and slender, parallel-sided or basally constricted 3

- Anal point short and very wide, widest at base and with rounded apex; WL 1.76-1.92 mm, AR 1.13-1.33, fLR 1.82-1.92; scutum yellow, stripes and scutellum reddish brown, abdominal terga brownish yellow, legs brown; dorsal appendage small, composed of triangular base and short and sickle-like distal blade bearing a long lateral seta arising near base (after Sasa, 1979) ***kasumiense* Sasa**

3 - Wing with macrotrichiae on extreme tip only; thorax and abdomen with conspicuous brown and yellow marks 4

- Wing with macrotrichiae on almost entire surface; body almost uniformly brown 5

4 - Abdominal tergites I, VII and VIII completely dark brown, II, IV and VI largely dark brown with apical and basal narrow pale bands, III and V entirely pale; WL 1.48-1.70 mm, AR 1.34-1.49, fLR 1.63-1.80; lateral seta of dorsal appendage arising at 1/3 from base (after Ree & Kim, 1988) ***pseudotritum* Ree et Kim**

- Abdominal tergites and scutum with more complicated dark and pale marks (see Sasa, 1988a, p.68, Plate IB6); WL 1.85 mm, AR 1.59, fLR 1.63; lateral seta of dorsal appendage arising from near base ***tigrinum* Hashimoto**

(The identity of the above two species should be clarified by comparison of the type specimens)

5 - Gonostylus short and broad, lateral margin strongly convex and widest at about distal 1/3 6

- Gonostylus long and slender, widest at about basal 1/3 7

6 - Lataral seta of dorsal appendage inserted at about basal 1/3; WL 2.17-2.52 mm, AR 1.78-1.93, fLR 1.20-1.29, fBR 3.4-4.7 (after Sasa, 1985b) ***sordens* (van der Wulp)**

- Lataral seta of dorsal appendage inserted at about distal 1/3 **sp. "*unagitertium*" of Sasa, 1985b**

7 - Dorsal appendage roughly C-shaped, basal portion very low, flat and broad, bearing some 5 inner setae which are almost as long as the distal blade, lateral seta inserted at about middle; WL 1.68-1.95 mm, AR 1.43-1.57, fLR 1.77-1.81, fBR 10.0 (after Sasa, 1979) ***shirokanense* Sasa**

- Base of dorsal appendage narrow and high, smoothly contiguous to the distal blade, which is only slightly curved 8

8 - AR 0.53-0.8 (Tokunaga, 1964), or about 0.9 (Johannsen, 1932; Sasa & Hasegawa, 1984); lateral seta of dorsal appendage inserted at about middle ***nodosum* Johannsen**

- AR 1.4 or higher **8**

9 - Lateral seta of dorsal appendage inserted near base of distal blade; anal point slightly expanded distally and with rounded apex; AR 1.5-1.8 (after Hashimoto, 1983) ***tritum*** **Walker**

- Lateral seta of dorsal appendage inserted at about distal 1/3; anal point almost parallel-sided and with truncate apex; WL 1.66-2.00 mm, AR 1.48-1.68, fLR 1.68-1.83, fTR 0.28-0.30, fBR 6.0-8.4 (after Sasa & Kikuchi, 1986) ***uncinatum*** **Goetghebuer**

7. Genus ***Phaenopsectra*** Kieffer, 1921

1 - Dorsal appendage with a long lateral seta **2**

- Dorsal appendage without lateral seta; body almost entirely black, legs brown; WL 3.4-4.5 mm, AR 2.26-2.53, fLR 1.13-1.23, fBR 5.6-9.0 (after Sasa, 1985) ***kizakiensis*** **Tokunaga**

2 - Body almost entirely black or dark brown **3**

- Scutum and postnotum black, scutellum, abdominal tergites and legs yellow; WL 2.6 mm, AR 2.17, fLR 1.23, fBR 3.4 (after Sasa, 1985a) ***punctipes*** **(Wiedemann)**

3 - Gonostylus stout, inner margin convex and apically pointed; WL 2.13, AR 0.98, fLR 1.32 ***tamahamurai*** **(Sasa)**

- Gonostylus long and slender, inner margin concave and with rounded apex; WL 2.45-2.96, AR 1.76-2.27, fLR 1.15-1.25, fBR 2.8-3.1 (after Sasa & Kikuchi, 1986) ***flavipes*** **(Meigen)**

8. Genus ***Polypedilum*** Kieffer, 1912

Genotype: *Polypedilum pelostomum* Kieffer, 1912 (= *Chironomus nubier* Skuse, 1889) by subsecuent designation of Ashe (1981, 51).

Key to the groups

1 - Dorsal appendage broad, pad-like, covered entirely with microtrichiae, with 1 to several long posterior setae and without bare terminal or inner process; ninth tergite often with a pair of conical processes flanking anal point; wing often with conspicuous dark marks **the *Tripodura* group (3)** **P.92**

- Dorsal appendage widest at base and with a bare, posterior or inner process; ninth tergite without processes flanking anal point; wing membrane rarely with dark marks **2**

2 - Basal portion of dorsal appendage much longer than wide, with a posterior lobe bearing 1 to several long setae, apical process arising from inner margin of the base and directed inwards; wing vein R2+3 almost in contact with R1 **the *cultellatum* group (4)** **P.94**

- Basal portion of dorsal appendage low and broad, often with long inner setae, and gradually continuous to the bare and hook-like apical process; wing

vein R2+3 more or less separated from R1 **3**

3 - Apical process of dorsal appendage without long lateral seta
the *nubifer* group (1) **P.90**

- Apical process of dorsal appendage with a long lateral seta
the *nubeculosum* group (2) **P.90**

(1) The ***nubifer*** group of genus ***Polypedilum***

(Dorsal appendage without long lateral seta on the distal blade)

1 - Wing membrane with cloudy marks; frontal tubercles present; gonostylus stout and with rounded apex; body entirely black; dorsal appendage with inner setae at the base; WL 2.70-3.00 mm, AR 2.63-2.94, fLR 1.34-1.48, fTR 0.24-0.26, fBR 3.6-5.6 (after Sasa & Hasegawa, 1983)
***nubifer* (Skuse)**

- Wing membrane without cloudy marks; frontal tubercles absent; gonostylus slender and with pointed apex; body yellow or brown **2**

2 - *Dorsal appendage almost straight, with 4 long inner setae at base, with microtri*chiae on basal 1/3; ground color of scutum brown, stripes dark brown; WL 1.96 mm, AR 2.07, fLR 1.57, fTR 0.26, fBR 3.2 (after Sasa & Hasegawa, 1983) ***medivittatum* (Tokunaga)**

- Dorsal appendage strongly curved, without inner setae and without microtrichiae at base; ground color of scutum yellow, stripes reddish brown *3*

3 - Abdomen yellow; dorsal appendage smoothly curved; WL 1.75 mm, AR 1.14 (after Sasa, 1985) **sp. "*chuzenudum*"**

- Abdomen black; dorsal appendage rectangularly curved; WL 1.97-2.11 mm, AR 1.8-1.9, fLR 1.72 (after Sasa, 1980) ***asakawaense* Sasa**

(2) The ***nubeculosum*** group of genus ***Polypedilum***

(dorsal appendage with a long lateral seta)

1 - Wing with 5 dark marks; dorsal appendage nearly C-shaped, lateral seta arising from near base of apical process; anal point long, slender and nearly parallel-sided; ventral appendage with pointed apex and a long apical seta; WL 2.12-2.35 mm, AR 1.27-1.33, fLR 1.48-1.59, fBR 2.8-4.6 (after Sasa, 1983) ***tamagohanum* Sasa**

- Wing without conspicuous dark marks **2**

2 - Body almost entirely pale yellow **3**

- Body not entirely pale yellow, either with dark marks on yellow ground color, or almost entirely dark brown or black **4**

3 - Dorsal appendage composed of a flat and wide base bearing 3 or 4 inner setae and a distal blade bearing a long lateral seta arising at about middle; WL 1.62-1.67 mm, AR 1.20-1.32, fLR 1.75-1.77, fBR 2.7-4.5 (after Sasa, 1980)
***takaoense* Sasa**

- Dorsal appendage simple horn-shaped and without setigerous base, bearing 2 or *3 long inner setae arising at about middle, and a long lateral seta arising*

at about distal 1/3; WL 1.95-2.03 mm, AR 1.66-1.84, fLR 1.84-1.80, fBR 3.6 (after Sasa, 1979) ***tsukubaense* Sasa**

4 - Anal point very short, narrow and with pointed apex; ninth tergite with a group of short, spine-like setae along posterior margin; body largely brown or dark brown, legs and halteres yellow, abdominal tergites largely pale brown and with narrow brown bands; dorsal appendage narrow and curved, tapering towards apex, lateral seta arising at basal 1/3; WL 1.13-1.19 mm, AR 0.89-0.96, fLR 2.00-2.16 (after Kawai & Sasa. 1985) ***parviacumen* Kawai & Sasa**

\- Anal point well developed; ninth tergite without spine-like setae along posterior margin **5**

5 - Wing with cloudy marks; gonostylus stout, widest at about distal 1/3; antepronotum with lateral hairs **6**

\- Wing without cloudy marks; gonostylus usually slender and widest at about middle or basal 1/3 (exception: *arundineti*); antepronotum without lateral hairs **7**

6 - Base of dorsal appendage narrow and without inner seta; WL 2.15-2.53 mm, AR 1.59-1.88, fLR 1.42-1.59, fBR 3.4-4.7 (after Sasa, 1980) ***tamagoryoense* Sasa**

\- Base of dorsal appendage broad and with 2-4 long inner setae; WL 2.54-3.23 mm, AR 1.80-2.16, fLR 1.39-1.54, fBR 2.4-3.5 (after Sasa, 1984) ***nubeculosum* (Meigen)**

7 - Abdominal tergites I to V largely or entirely pale yellow; female antenna with 6 flagellar segments **8**

\- Abdominal tergites I to V largely or entirely dark; antenna of known females with 5 flagellar segments **9**

8 - Dorsal appendage strongly curved like figure C, the distal half very narrow and apically hooked; abdominal tergites I to VIII yellow; femora and tibiae of all legs black or dark brown, tarsi yellow; WL 2.25-2.52 mm, AR 0.78-0.89, fLR 1.49-1.65, fBR 2.8-3.2 (after Sasa, 1983) ***tamaharaki* Sasa**

\- Dorsal appendage almost straight and only slightly hooked apically; abdominal tergites I to VI yellow, the distal tergites black; basal half of front femur black, front tibia narrowly black at tip, the rest parts and front tarsi yellow, middle and hind legs entirely yellow; WL 2,12-2.52 mm, AR 0.86-0.96, fLR 1.41-1.54, fBR 2.4-3.0 (after Sasa et al., 1988) ***pedestre* (Meigen)**

9 - Scutum with median and lateral stripes yellow, and three dark lines between the stripes, prescutellar area also black; abdominal tergites largely dark brown but tergites II to VI each with a pair of large pale spots in the caudolateral corners; dorsal appendage with a high, triangular base and slightly curved distal blade bearing a lateral seta arising from near base; WL 1.51-1.86 mm, AR 1.65-2.07, AHR 0.42-0.60, fLR 1.53-1.76, fBR 3.2-5.7 (Sasa, unpublished data with specimens from Toyama) ***kyotoense* (Tokunaga)**

\- Scutum largely dark brown or black, stripes darker than the rest parts **10**

10- AR larger than 1.4 **11**

- AR smaller than 0.9 **13**

11- Frontal tubercles present; dorsal appendage composed of a low and flat base and a smoothly curved distal blade bearing lateral seta at distal 1/3; WL 1.86-1.93 mm, AR 1.71-1.76, fLR 1.89, fBR 3.2 (after Sasa, 1985) ***unagiquartum* Sasa**

- Frontal tubercles absent; basal portion of dorsal appendage higher and narrower, lateral seta arising at about middle or basal 1/3 12

12- Dorsal appendage smoothly curved, lateral seta arising at near base; ground color of scutum yellow, stripes and postnotum dark brown, scutellum yellow, legs yellow; abdominal tergites II to VI each with a narrow basal and caudal pale bands; WL 2.14 mm, AR 1.55, fLR 1.61, fBR 3.3 (after Sasa, 1985a) ***arundineti* Goetghebuer**

- Dorsal appendage abruptly curved at about middle and apically hooked, lateral seta arising at about middle; scutum and scutellum almost entirely dark brown, postnotum black; abdominal tergites almost uniformly dark brown; WL 1.58-1.79, AR 1.50-1.56, fLR 1.85-1.93, fBR 3.0-4.0 (after Sasa & Hasegawa, 1988) ***kunigamiense* Sasa et Hasegawa**

13- Last antennal segment very short, AR 0.40-0.47, antennal hairs also very short, AHR 0.17-0.19; basal setigerous portion of dorsal appendage relatively long and high, distal blade wide at base and tapering towards apex, lateral seta arising at near base; WL 1.50-1.67 mm, fLR 1.68-1.73, fBR 3.0-3.1 ***tamahosohige* Sasa**

- AR 0.65-0.80, antennal hairs roughly half as long as antennal shaft, AHR larger than 0.4; distal blade of dorsal appendage narrower at base 14

14- Lateral seta of dorsal appendage arising near the base; anal point nearly parallel-sided and with rounded apex; WL 1.66 mm, AR 0.70, fLR 1.84, fBR 2.9 (after Sasa & Hasegawa, 1983) ***benokiense* Sasa et Hasegawa**

- Lateral seta of dorsal appendage arising at distal 1/3; anal point slender, tapering towards rather pointed apex; WL 1.43-1.70, AR 0.65-0.79, fLR 1.79-1.96, fBR 2.0-4.0 (after Sasa, 1983) ***tamanigrum* Sasa**

(3) The *Tripodura* group of genus *Polypedilum*

(Dorsal appendage broad and pad-like, without horn-like distal blade, and with one to several long setae on posterior margin; ninth tergite often with a pair of processes on posterior margin flanking anal point; wing often with dark marks)

1 - Wing without dark marks; WL 2.05-2.07 mm, AR 1.46-1.57, fLR 1.46-1.52, fBR 3.0-3.2; lateral tubercles flanking anal point long, narrow and apically pointed (after Sasa, 1985a) ***scalaenum* (Schrank)**

- Wing with dark marks **2**

2 - Wing with one dark patch in cell R-M (between R4+5 and M), and another patch in cell Cu (between Cu1 and Cu2) **3**

- Wing with two or more dark patches in cell R-M, and with two dark patches in cell Cu **7**

3 - Ninth tergite with a pair of processes flanking anal point **4**
- Ninth tergite without such processes; anal point wide and short; dorsal appendage with a beak-like inner process and two long setae on posterior margin; WL 1.24-1.69 mm, AR 1.26-1.67, fLR 1.98-2.34, fTR 0.33-0.39, fBR 3.2-3.8 (after Sasa & Kikuchi, 1986) ***japonicum* (Tokunaga)**

4 - Anal point long, slender and parallel-sided; AR 0.6-0.8; body largely yellow **5**
- Anal point short and stout; AR usually higher than 1.1 **6**

5 - Dorsal appendage with only one long seta; lateral processes flanking anal point long and sharply pointed; WL 1.33-1.46 mm, AR 0.58-0.66, fLR 1.75- 1.96 (after Sasa, 1980) ***unifascium* (Tokunaga)**
- Dorsal appendage with 4 long marginal setae; processes flanking anal point low and roughly rectangular; WL 1.32-1.53 mm, AR 0.81-0.86, fLR 1.96-2.05, fTR 0.33-0.36, fBR 2.5-3.2 (after Sasa & Hasegawa) ***miyakoense* Hasegawa et Sasa**

6 - Body largely yellow; dark marks on wing rather faint; anal point stout and parallel-sided; lateral processes on ninth tergite low and very broad; dorsal appendage much longer than wide, with only one long posterior seta; WL 1.46-1.62 mm, AR 1.13-1.15, fLR 1.92-2.06, fTR 0.32-0.34, fBR 2,9-3,3 (after Sasa & Hasegawa, 1983) ***tananense* Sasa et Hasegawa**
- Body largely dark brown; dark marks on wing conspicuous; anal point narrow at base and apically expanded, sometimes like figure T; lateral processes flanking anal point long, narrow and apically pointed; dorsal appendage almost as wide as long, with 3-6 long setae; WL 1.57-1.70 mm, AR 1.14-1.38, AHR 0.54-0.57, fLR 1.87-2.00, fTR 0.33-0.34, fBR 3.0-3.3 (after Sasa, 1983) ***tamahinoense* Sasa et Ichimori**

7 - Wing with two dark patches in cell R-M; dorsal appendage long and finger-like, not expanded apically and with only one long terminal seta; ninth tergite with a pair of low and obtuse processes at the base of anal point; AR about 1.8, fLR about 2.0 (after Tokunaga, 1938) ***sagittiferum* (Tokunaga)**
- Wing with three dark patches in cell R-M; dorsal appendage shorter and apically expanded, with 3-5 long setae 8

8 - Anal point constricted at base and expanded apically; ninth tergite with a pair of conspicuous processes flanking anal point; dorsal appendage with a long lateral seta, and 4 shorter inner setae; AR about 2.0, fLR about 1.8 (after Tokunaga, 1938) ***decematoguttatum* (Tokunaga)**
- Anal point narrow and parallel-sided; ninth tergite without processes flanking anal point; dorsal appendage short, expanded apically, with 4 long setae on posterior margin and 3 shorter setae on inner margin; WL 1.79 mm, AR 1.52, AHR 0.54, fLR 1.83, fBR 4.2 (after Sasa, 1985b) ***masudai* (Tokunaga)**

Note: *Polypedilum unifascium* (Tokunaga, 1938) was described by female only, and *P. trinimaculum* (Tokuanga, 1940) with female as the holotype and without describing the structure of male hypopygium. Both belongs to the subgroup with only

one dark patch in cell R-M, of the subgenus Tripodura. The species of this subgroup are usually difficult to be distinguished by female, but at least five species could be differentiated by male hypopygium, as in the key presented here. The specimens of male described by Sasa (1980, p.32) collected at Stations 1 and 2 (upstream parts) of River Minamiasakawa was designated as that of *unifascium* (Tokunaga), but later speceis clearly differentiated by male hypopygium but similar in the structure of females were recorded from other localities in Japan. The position of males of *P. trinimaculum* (Tokunaga) is also unknown.

Polypedilum sp. "chuzetripodrum" of Sasa(1984, p.61), as well as those collected in large numbers at Hanamuro (Ibaraki) and was provisionally treated as *Polypedilum hanamuroense* seem to belong to *P. tamahinoense* Sasa et Ichimori, 1983.

(4) The ***cultellatum*** group of genus ***Polypedilum***

(Dorsal appendage composed of a long pad covered entirely with microtrichiae and bearing one to several setae on posterior margin, and a bare horn-like inner blade attached to near its posterior corner)

1 - Anal point triangular, widest at base and tapering towards apex; posterior lobe of dorsal appendage narrow and strongly produced, bearing only one long seta; body largely yellow; WL 1.8 mm, AR 1.82 (after Sasa & Kikuchi, 1986) ***aviceps* Townes**

- Anal point narrow and almost parallel-sided **2**

2 - Dorsal appendage with 2-5 long setae on posterior lobe, and 3-5 inner setae in basal portion ***cultellatum* Goetghebuer** **3**

- Dorsal appendage with only one long posterior seta, and with no or one inner seta in basal portion **4**

3 - Posterior lobe of dorsal appendage strongly produced backwards, and bearing 4 or 5 (rarely 3) long setae ***cultellatum* Goetghebuer, var. *cultellatum***

- Posterior lobe of dorsal appendage not produced backwards, and bearing 2 or 3 long setae ***cultellatum* Goetghebuer, var. *ureshinoense***

4 - Dorsal appendage with a strong seta at the base of inner blade; body pale yellow; WL 1.43-1.58mm, AR 1.43-1.69, fLR 1.74-1.92, fBR 2.2-3.1 ***hiroshimaense* Kawai et Sasa**

- Dorsal appedage without a strong seta at the base of inner blade **5**

5 - Body largely dark brown; dorsal appendage not produced behind inner blade, and with a long inner seta on basal portion; ventral appendage not apically constricted, and with about 10 recurved setae; WL 1.53-1.73mm, AR 0.95-1.00, fLR 1.61-1.69, fBR 3.7 ***tamasemusi* Sasa**

- Body largely pale yellow; dorsal appedage strongly produced behind inner blade, and without long inner seta; ventral appendage constricted near apex, and with some 20 recurved setae; AR 1.5-1.8 (after Edwards, 1929 and Piner, 1978) ***convictum* (Walker)**

9. Genus ***Stenochironomus*** Kieffer, 1919

1 - Scutum with no or two dark spots **2**

- Scutum with four dark spots; wing with a large dark area in the middle (known

by female only) ***satorui* (Tokunaga et Kuroda)**

2 - Wing membrane with dark or cloudy marks **3**

- Wing membrane without dark or cloudy marks; scutum with two dark spots, postnotum with a pair of ovoid dark areas, abdominal tergites I to V yellow, distal part of VI and all the following tergites dark brown, the rest body parts pale yellow; ventral appendage with a long and stout terminal spine; WL 2.48-2.52 mm, AR 2.30-2.36, fLR 1.16-1.21, fBR 3.1-4.0; ninth tergite with spines at the base of anal point (after Sasa, 1985b, p.35) ***membranifer* Yamamoto**

3 - Wing with dark and pale areas on distal half; scutum with two dark spots **4**

- Distal half of wing uniformly pale brown; scutum without dark spots; body largely pale yellow; WL 1.9-2.6 mm, AR 1.04-1.63, fLR 1.13-1.26 (after Yamamoto, 1981) ***nubilipennis* Yamamoto**

4 - Ventral appendage strongly curved, and with a long terminal spine; wing with cloudy areas in the middle and distal portions; front tarsi I to V with pale and dark rings; WL 2.74 mm, AR 2.30, fLR 1.31, fBR 5.0; ninth tergite with spine groups at the base of anal point (after Sasa & Kawai, 1988) ***oyabearcuatus* Sasa et al.**

- Ventral apendage only slightly curved; wing with conspicuous dark area in the middle; tarsi not ringed **5**

5 - Wing with a large dark area at tip; AR 3.68, fLR 1.14; all femora largely yellow and with apical dark ring, front tibia entirely black, middle and hind tibiae largely yellow and with apical and/or basal dark ring; larvae are found mining in leaves of "hasu", *Nelumbo nucifera* (after Tokunaga & Kuroda, 1935 ***nelumbus* Tokunaga et Kuroda**

- Wing with much smaller dark area at tip; AR 1.23, fLR 1.30; femora and tibiae of all legs entirely dark brown; collected at high altitudes of Honshu (*bitensis* Kieffer, 1924, sensu Tokunaga & Kuroda, 1935) ***gibbus* (Fabricius)**

Note: *Stenochironomus takahashii* Tokunaga, 1938, was described by female only, has a characteristic pattern of dark marks on wing.

10. Genus *Stictochironomus* Kieffer, 1919

(Scutum with a small dorsal tubercle; terminal comb of middle and hind tibiae with only one spur; fLR only slightly larger than 1.0: gonocoxite longer than gonostylus; wing usually with distinct dark marks, legs usually ringed with dark and pale rings)

1 - Wing without dark marks; leg segments not ringed; WL 3.82-3.90 mm, AR 2.64-2.82, DM 15-17, DL 22-26, PA 8-10, SC 20-24, RR 0.27-0.33, VR 1.10-1.14, R/Cu 1.16-1.19, fLR 1.16-1.19, fBR 3.0-3.3 (after Sasa, 1988b) ***abasirisecundus* Sasa et Shirasaka**

- Wing with distinct dark marks; leg segments with dark and pale rings **2**

2 - Wing with several dark spots **3**

- Wing with only one dark area around r-m 4

3 - Gonocoxite diverging laterally towards apex; dorsal appendage strongly curved like figure C, basal setae arising at about middle; wing marks rather conspicuous; WL 2.31-2.45 mm, AR 1.58-1.81, fLR 1.26-1.37, fBR 2.9-4.5 (after Sasa, 1984) ***multannulatus* (Tokunaga)**

- Gonocoxite almost parallel to body axis; dorsal appendage almost straight but abruptly hooked apically; wing marks rather faint (recorded by Yamamoto, 1980, from Japan) ***pictulus* (Meigen)**

4 - Tarsal segments of legs entirely dark excepting basal and middle portions of tarsi I, which are slightly paler; WL 2.94-3.71 mm, AR 1.96-2.47, AHR 0.54-0.67, fLR 1.05-1.19, fBR 2.9-3.9 (after Sasa & Kamimura, 1987) ***histrio* (Fabricius)**

- Tarsi I to III of all legs largely white and with an apical dark ring 5

5 - Gonocoxite almost parallel to body axis; dorsal appendage strongly hooked apically; WL 3.00-3.55 mm, AR 1.89-2.21, fLR 1.13-1.19, fBR 1.8-2.6 (after Sasa, 1984) ***akizukii* (Tokunaga)**

- Gonocoxite diverging laterally towards apex; dorsal appendage only slightly curved near apex; WL 2.45-3.30 mm, AR 1.43-1.83, fLR 1.05-1.21, fBR 2.5-2.8 (after Sasa & Ichimori, 1983) ***tamamontuki* Sasa et Ichimori**

AB. Tribe TANYTARSINI

Key to genera

1 - All tibiae with a simple terminal process; middle and hind tibiae with a terminal comb composed of free spurs; wing membrane bare ***Biwatendipes* Tokunaga** **P.97**

- Only front tibia with a simple terminal process (exception: *Yuasaiella*), middle and hind tibiae with terminal scales composed of fused spurs; wing membrane with macrotrichiae 2

2 - Front tibia without terminal process; middle and hind tibiae with terminal combs composed of very short and free spinules; front tibia longer than front tarsus I (fLR$<$1.0) ***Yuasaiella* Tokunaga** **P.109**

- Front tibia with a simple terminal spur, middle and hind tibiae with terminal combs composed of fused spinules and with or without a spur; front tarsus I much longer than front tibia (fLR$>$1.0) 3

3 - Terminal combs of middle and hind tibiae usually contiguous and with or without spur (if clearly separated, spurs are absent); anal point usually wide and apically rounded, with a pair of strong lateral ridges but without spine clusters 4

- Terminal combs of middle and hind tibiae clearly separated, and at least one bearing a longish spur; anal point with various shape and structure, often long and slender, with spine clusters, with micro or macrotrichiae 5

4 - Dorsal appendage much longer than wide and finger-like, with a basal median tubercle bearing a long, medially directed seta; digitus small and hidden behind dorsal appendage; median appendage often bearing spoon-like setae; anal point roughly triangular, widest at base and tapering towards

rounded or pointed apex and with a pair of simple lateral ridges; tibial combs usually confluent and without spur
Micropsectra Kieffer **P.98**

- Dorsal appendage oval in shape, without a basal tubercle and without a basal seta; digitus long and extending much beyond inner margin of dorsal appendage; setae on median appendage simple or leaf-like; anal point wide and apically rounded, with a pair of scale-like ridges; tibial combs with one or two short spurs **Paratanytarsus Bause** **P.100**

5 - Eyes pubescent; wing cuneiform **Zavrelia Kieffer** **P.109**
- Eyes bare 6

6 - Anal point broad, apically rounded, dotted with numerous small spines but without spine clusters and lateral ridges; eyes reniform, without dorsomedial projection, ER larger than 1.0; antepronotum widely separated in the middle **Neozavrelia Goetghebuer** **P.100**
- Anal point not dotted with numerous spines, often long and slender, with spine clusters or strong lateral ridges; eyes with conspicuous dorsomedial projection, ER much smaller than 1.0; antepronotum united in the middle 7

7 - Median appendage with long and branched lamellar setae; wing with macrotrichiae on distal half only **Cladotanytarsus Kieffer** **P.97**
- Median appendage with simple or leaf-like setae and without such long branched setae; wing with macrotrichiae on almost entire surface 8

8 - One terminal comb of hind tibia without spur; wing often cuneiform; R4+5 ending before tip of Cu1 **Stempellina Bause 1913** **P.103**
- Both terminal combs of hind tibia usually spurred; wing with more or less produced anal lobe; R4+5 ending above or beyond tip of Cu1 9

9 - Gonostylus abruptly narrowed distally; anal point long, narrow, parallel-sided, with lateral ridges and without spine clusters; digitus absent (exception: *kyotoensis*) **Rheotanytarsus Bause** **P.101**
- Gonostylus smoothly tapered distally; anal point wider, often with spine clusters between lateral ridges; digitus usually present, rarely absent
Tanytarsus van der Wulp **P.103**

1. Genus ***Biwatendipes*** Tokunaga, 1965

One species, ***motoharui* Tokunaga, 1965,** was recorded from Lake Biwa (Shiga); wing without macrotrichiae, middle and hind tibiae without terminal combs and all tibiae with a simple terminal spur; anal point covered with microtrichiae but without spine clusters and lateral ridges; body almost uniformly black; WL 2.14-2.69 mm, AR 2.21-2.88, fLR 1,79-1.92, fBR 1.7-2.7 (after Sasa & Kawai, 1987a)

2. Genus ***Cladotanytarsus*** Kieffer, 1922

1 - Body entirely yellowish, scutal stripes indistinguishable; setae on median appendage all simple, not branched; WL 1.2-1.3 mm, AR 0.91-1.05, fLR 2.47-2.57 (after Ree et Kim, 1988) ***sinjongensis* Ree et Kim**

- Body with brown marks on yellow, scutal stripes conspicuous; setae on median appenmdage branched; WL 0.98-1.30 mm, AR 0.78-0.93, fLR 2.30-2.51 (after Sasa & Kawai, 1988) ***vanderwulpi* (Edwards)**

3. Genus ***Micropsectra*** Kieffer, 1911

1 - Large black midge with BL larger than 4.5 mm and WL larger than 3.5 mm; wing with macrotrichiae rather sparsely on distal half only; frontal tubercles present **2**

- Body coloration paler, at most dark brown, sometimes entirely pale yellow; WL smaller than 3.2 mm; macrotrichiae distributed densely on entire wing length **3**

2 - AR extremely high, 2.72-3.51; fLR unusually small, 1.03-1.08; tarsi with long beards, fBR 10.0-12.0; anal point narrow and parallel-sided; digitus short, finger-like and parallel-sided; median apendage very short, about 1/3 the length of ventral appendage including the terminal spatulate setae (after Sasa, 1984) ***yunoprima* Sasa**

- AR about 1.4; fLR, fBR unknown; anal point short and triangular; digitus triangular and apically pointed; median appendage long and slender, reaching to beyond middle of ventral appendage (after Tokunaga, 1939) ***taiwana* (Tokunaga)**

3 - Body entirely greenish yellow or whitish yellow, without dark marks **4**

- Body largely brown or dark brown **6**

4 - Small midge, BL 2.82-2.84 mm, WL 1.64-1.67 mm; AR small, 0.90; fLR large, 2.11; fBR 3.7; anal point short, parallel-sided and apically rounded; dorsal appendage roughly egg-shaped; digitus long and slender, extending beyond inner margin of dorsal appendage; median appendage about half as long as ventral appendage, with spoon-like setae on distal 1/4; ninth tergite with a pair of tubercles on posterior margin (after Sasa, 1980) ***tamaprima* Sasa**

- Larger midge, BL 3.3 mm or larger; AR 1.0-1.2; fLR 1.60-1.73; digitus shorter, not extending beyond inner margin of dorsal appendage; (ninth tergite probably without lateral tubercles) 5

5 - Anal point almost parallel-sided and apically rounded; median appendage long, slender, reaching to tip of ventral appendage (after Tokunaga, 1938) ***daisenensis* (Tokunaga)**

- Anal point triangular, widest at base and apically rounded; median appendage shorter, reaching slightly beyond middle of ventral appendage; (hypopygium closely resembling that of *praecox* Meigen) (after Tokunaga, 1940) ***subviridis* Goetghebuer**
(*subviridis* Goetghebuer was regarded as a synonym of *junci* Meigen and redescribed by Saewedal, 1976, p.131, and Pinder, 1978, p.144, fig.175A)

6 - Dorsal appendage sickle-shaped, inner margin concave, tapering towards pointed apex, digitus absent; BL 3.6 mm, AR 0.81, fLR 1.63; anal point short and stout basally, abruptly narrowed near apex, excavated dorsally on basal part; median appendage about 3/4 the length of ventral append-

age, bearing spoon-like setae on distal half; body largely brown, scutal stripes dark brown (after Tokunaga, 1940)
***shinaensis* (Tokunaga)**

- Dorsal apendage thumb-like, more or less rounded apically; digitus present 7

7 - Anal point widest at base and narrowing towards apex; digitus long and extending beyond inner margin of dorsal appendage; frontal tubercles present 8

- Anal point narrow, slender and almost parallel-sided; digitus short, not extending beyond inner margin of dorsal appendage; frontal tubercles absent; ninth tergite without lateral processes **11**

8 - Ninth tergite with a pair of processes on posterior margin; anal point smoothly tapering towards apex **9**

- Ninth tergite without processes on posterior margin; anal point very wide at base, abruptly narrowed in the middle, distal half roughly parallel-sided; body brown, with dark brown marks; WL 2.24-2.54 mm, AR 0.91-1.04, fLR 1.71-1.81, fBR 3.8-8.7 (after Sasa & Kawai, 1988)
***nakaokii* Sasa et al.**

9 - Anal point roughly rectangular, nearly as long as wide; dorsal appendage almost parallel-sided and smoothly rounded apically; digitus very long, straight and extending much beyond dorsal apendage; median appendage with long spatulate setae arising on distal 1/5 of the shaft; BL 3.16-3.60 mm, WL 2.16-2.26 mm, AR 1.39-1.50, fLR 1.66-1.72, fBR 3.7-4.5 (after Sasa, 1984)
***chuzelonga* Sasa**

- Anal point much longer than wide; dorsal appendage and digitus differently shaped; ventral appendage with spoon-like setae arising on distal 1/2 of the shaft **10**

10- Dorsal appendage with almost straight inner margin and convex lateral margin, somewhat tapering towards apex; digitus long, curved and apically pointed; anal point widest at about basal 1/3; BL 3.8-4.1 mm, AR 1.3, fLR 1.6-1.7 (after Tokunaga, 1938) ***fossarum* Tokunaga**

- Dorsal appendage with concave inner margin, distal half curved inwards, digitus straight and extending only slightly beyond inner margin of dorsal apendage; anal point widest at base and apically forming a short and parallel-sided apical process; BL 4.00 mm, WL 2.39 mm, AR 1.33, fLR 1.02 (unusually small) (after Sasa, 1988) ***utonaitertia* Sasa**

11- Body largely dark brown; WL 2.97-3.16 mm, AR 1.34-1.54; dorsal appendage much longer than wide, triangularly pointed apically; median apendage relatively long and slender, with spoon-like setae on distal 1/4; fLR 1.52-1.54, fBR 4.0-4.3 (after Sasa, 1984) ***chuzeprima* Sasa**

- Body paler, ground color of scutum yellow, stripes brown; WL 1.93-2.28 mm, significantly smaller, AR 1.04-1.16; dorsal appendage almost as long as wide, nearly circular; medina appendage very short, almost globular; fLR 1.41-1.52, fBR 4.0-4.3; ventral appendage short and stout, apically expanded (after Sasa. 1984) ***chuzenotescens* Sasa**

Note: In addition, a species was recorded by Tokunaga (1940, p.305) by the name of *Tanytarsus (Micropsectra) praecox* Meigen from Mount Hiei, Kyoto, without

giving figures. It has body length 4 to 4.5 mm, AR about 1, LR1 about 1.75. *Chironomus praecox* Wiedemann in Meigen, 1818 as well as *Tanytarsus (Micropsectra) subviridis* Goetghebuer 1921 of Edwards (1929) was regarded as synonyms of *Micropsectra junci*, (Meigen, 1818) by Saewedal (1976). *M. junci*, as redescribed by Saewedal (1976, p.131), differs from the above Japanese species in that appendage 2 with a transverse ridge.

4. Genus ***Neozavrelia*** Goetghebuer, 1941

(Anal point stout, without lateral ridges and without spine clusters, covered entirely with microtrichiae; dorsal appendage elongate oval and bearing long setae; digitus long, extending far beyond inner margin of dorsal appendage; wing with rather small numbers of macrotrichiae on distal half; fCu much beyond r-m)

1 - AR 0.62-0.80, VR 1.33-1.42; anal point short and stout, hardly longer than wide; dorsal appendage with 2 terminal setae; digitus curved and tapering towards pointed apex; WL 1.08-1.28 mm, ER 1.26-1.65, fLR 1.62-1.85, fBR 3.0-5.5 (after Sasa & Kawai, 1987) ***bicoliocula* (Tokunaga)**

\- AR 0.43, VR 1.6; anal point much longer than wide; dorsal appendage with 3 terminal stae; digitus straight and apically rounded; WL 1.67 mm, ER 1.60, fLR 1.64 (after Sasa, 1980) ***tamanona* (Sasa)**

5. Genus ***Paratanytarsus*** Bause, 1913

1 - Wing membrane without macrotrichiae; tarsi II to IV of middle legs short and cordiform (other morphological characters are typical of this genus); WL 1.08 mm, ER 0.35; antenna with 13 flagellar segments, AR 0.36, AHR 0.36; fLR 1.21, mLR 0.42, hLR 0.56 (after Sasa & Kawai, 1987a) ***biwatertius* Sasa et Kawai**

\- Wing with macrotrichiae; all tarsi cylindrical as usual **2**

2 - Antenna with 12 flagellar segments, AR 0.32-0.35; median appendage long, reaching to almost tip of ventral appendage, with numerous spoon-like setae on distal portion; fLR 1.6; tarsi without long beards; dorsal appendage hemispherical, inner margin convex; digitus long and apically pointed (after Tokunaga, 1938) ***tredecemarticulus* (Tokunaga)**

\- Antenna with 13 flagellar segments as usual, AR larger than 1.0 **3**

3 - Ninth tergite with a pair of processes on posterior margin flanking anal point; median appendage long, apical setae spoon-like and reaching to beyond tip of ventral appendage **4**

\- Ninth tergite without processes on posterior margin; median appendage shorter, not reaching to beyond tip of ventral appendage **5**

4 - Processes on ninth tergite much longer than wide; median appendage slender, setae shorter; AR about 1.3, fLR about 2 (after Tokunaga, 1938) ***stagnarius* (Tokunaga)**

\- Processes on ninth tergite roughly rectangular, wider than long; median appendage stouter, setae longer; WL 1.62-1.90 mm, AR 1.11- 1.26, fLR 1.76-1.96,

fBR 3.5-4.4 (after Sasa, 1985) ***miikesecundus*** **(Sasa)**

5 - Terminal combs of middle and hind tibiae confluent and with one or two short spurs; median appendage short and not reaching to tip of ventral appendage **6**

- Terminal combs of middle and hind tibiae separated, one or both with a short spur; median appendage long, reaching to near tip of ventral appendage **7**

6 - Ventral appendage conspicuously swollen apically; tip of median appendage reaching to the level of about 2/3 the length of ventral appendage and with narrow, leaf-like apical setae; anal point with short setae dorsally; WL 1.60-2.20 mm, AR 1.08-1.38, ER 0.33-0.61, DM 11-17, DL 7-12, PA 1-2, fLR 1.59-1.73, fBR 3.1-4.7 (after Sasa, 1983) ***tamanegi*** **Sasa**

- Ventral appendage not swollen apically; tip of median appendage reaching to only about middle of ventral appendage, and with simple setae only; anal point without setae dorsally; AR 1.3, fLR 1.5; tarsal beard absent (after Tokunaga, 1938) ***telmatophilus*** **(Tokunaga)**

7 - Median appendage with simple setae only; dorsal appendage with a conspicuous tubercle bearing a long seta at the base of digitus; frontal tubercles present; WL 2.17-2.38 mm, AR 1.39-1.57, VR 1.13-1.18, fLR 1.20-1.26, fBR 5.2-6.2 (after Sasa & Kamimura, 1987) ***inopertus*** **(Walker)**

- Median appendage with numerous lamellar setae apically; dorsal appendage without basal tubercles; frontal tubercles absent; WL 1.47-2.12 mm, AR 1.08-1.37, fLR 1.52-1.71, fBR 3.8-5.2 (after Sasa, 1988) ***toyaprimus*** **Sasa**

Note: In addition, a parthenogenetic species, ***Paratanytarsus grimmii*** (Schneider) (=*parthenogeneticus* (Freeman)) was recorded by Sasa (1979).

6. Genus *Pontomyia* Edwards, 1926

Note: For differentiation of two species recorded from Japan, see Tokunaga (1932a, b) and Hashimoto (1959, 1962).

7. Genus *Rheotanytarsus* Bause, 1914

1 - Shaft of median appendage relatively long, reaching to near apex of ventral appendage, and apically forked into two lobes like a boxing glove, and bearing only short and simple setae **2**

- Median appendage not forked into two lobes at apex, and bearing various types of long setae **3**

2 - Dorsal appendage roughly egg-shaped and with a large, blade-like digitus which extend beyond inner margin of dorsal appendage (in all other Japanese *Rheotanytarsus* species, digitus is absent or small and not extending beyond inner margin of dorsal appendage); WL 1.32-1.50 mm, AR 0.70-0.90, fLR 1.96-2.29; collected from rather polluted sites of rivers (after Sasa, 1980) ***kyotoensis*** **(Tokunaga)**

- Dorsal appendage roughly square and bearing no digitus; wing cell R1 and R3 narrower, and vein R2+3 obliterated; BL 2.2-2.6 mm, AR 0.85-0.95, fLR 2.1-2.2; collected from hot spring at Tsuta-Onsen, Aomori (after Tokunaga, 1940) ***thermae* (Tokunaga)**

3 - Median appendage with a highly chitinized accessory process at base and bearing long, curved setae which extend beyond tip of ventral appendage; WL 1.08-1.27 mm, AR 0.63-0.72, fLR 2.21-2.52, fBR 3.9; collected from main stream of River Ohta (after Kawai & Sasa, 1985) ***rivulophilus* Kawai et Sasa**

- Median appendage without such basal process **4**

4 - Median appendage bearing very long, caudally directed simple setae which extend far beyond tip of ventral appendage; AR small, 0.15-0.18, WL 1.05-1.07 mm, fLR 2.17, fBR 3.1; collected from a small mountain stream (after Sasa, 1980) ***tamasecundus* Sasa**

- Setae on median appendage shorter and ending much proximal to tip of gonostylus; AR larger than 0.2 **5**

5 - Lateral ridges of anal point united in the middle forming a cavity at the base of anal point **6**

- Lateral ridges of anal point separated at the base of anal point **7**

6 - Cavity at the base of anal point nearly circular; body almost uniformly pale yellow, including abdominal tergites; median appendage bearing both simple and lamellar setae; WL 1.11-1.22 mm, AR 0.38-0.47, fLR 1.97-2.06; collected from slightly polluted sites of Tama River (after Sasa, 1980) ***tamaquintus* Sasa**

- Cavity at the base of anal point longer than wide; abdominal tergites II to VII each with a dark band; median appendage bearing simple setae only; WL larger (1.71-1.91 mm), AR larger (0.87-1.09), fLR 1.91-2.05, fBR 3.1-3.8; collected from mouth of river and coastal rice paddies (after Sasa & Kikuchi, 1985) ***aestuarius* (Tokunaga)**

7- Shaft of median appendage highly twisted like figure S, and bearing short setae all directed inwards **8**

- Median appendage slightly curved but not twisted, bearing short setae all directed backwards **9**

8 - Ninth tergite with two long setae at the base of anal point; dorsal appendage roughly oval, ventral appendage swollen apically; WL 1.18-1.26 mm, AR 0.23-0.53, fLR 2.1-2.4 (after Sasa, 1980) ***tamatertius* Sasa**

- Ninth tergite without long seta at the base of anal point; dorsal appendage roughly rectangular, ventral appendage not swollen apically; WL 1.13-1.21 mm, AR larger (0.61-0.76), fLR 2.36-2.65 (after Kawai & Sasa, 1985) ***fluminis* Kawai et Sasa**

9 - Median appendage bearing very broad lamellar setae along its entire length; anal point rather stout and constricted basally; dorsal appendage roughly semicircular; BL 2.09-2.33 mm, WL 1.29-1.44 mm, AR 0.69-0.78, fLR 2.10-2.28; collected from upstream parts of River Tama (after Sasa, 1980) ***tamaquartus* Sasa**

- Median appendage without broad lamellar setae; anal point narrow, slender and

parallel-sided 10

10- Antenna with 13 flagellar segments, AR 0.4-0.5; body greenish white in ground color; setae on median appendage leaf-like; dorsal appendage roughly triangular; BL 2.6 mm, fLR about 2.0; collected along a mountain stream (after Tokunaga, 1938) ***parvicrinis* Tokunaga**

\- Antenna with 12 flagellar segments, AR 0.77-0.93; body yellowish brown, abdominal tergites I to VI each with a narrow dark apical band; setae on median appendage all narrow and simple; dorsal appendage elliptic; WL 0.62 mm, fLR 1.99-2.22; collected in Korea (after Ree & Kim, 1988) ***dogoensis* Ree et Kim**

8. Genus *Stempellina* Bause, 1913

One species, ***okadai* Tokunaga, 1939,** was recorded from hot spring water of of Tsubame-Onsen (Niigata). Body brown, with black lateral vittae. BL 1.6-1.8 mm, AR 0.35-0.4, fLR 1.5; anal point short and stout, with short setae and microtrichiae but without lateral ridges.

9. Genus *Tanytarsus* van der Wulp, 1893

Key to species groups

1 - Marine species, larvae breeding in tide pools; pulvilli well developed; anal point absent, or very short and without spine clusters; AR small, 0.2-0.5, fLR 1.6 or less ***boodleae* group (1) P.103**

\- Larvae breeding in freshwater; pulvilli absent or very small; anal point well developed; AR usually larger than 0.6, fLR larger than 1.6 **2**

2 - Anal point without lateral ridges and without spine clusters ***kirai* group (2) P.104**

\- Anal point with lateral ridges and with or without spine clusters **3**

3 - Anal point without spine clusters ***usumaensis* group (3) P.105**

\- Anal point with spine clusters **4**

4 - Digitus absent, or very small and less than 1/2 the length of dorsal appendage, and completely hidden behind it ***oyamai* group (4) P.105**

\- Digitus longer, extending beyond inner or posterior margin of dorsal appendage **5**

5 - Median appendage absent, or short and apical setae not reaching to tip of ventral appendage ***mendax* group (5) P.106**

\- Median appendage very long and apical setae directed caudally, their tips extending beyond tip of ventral appendage or beyond it ***yunosecundus* group (6) P.108**

(1) The *boodleae* group of genus *Tanytarsus*
(marine species)

1 - Wing without macrotrichiae (wing with macrotrichiae in female); anal point

low, flat and with two subterminal setae; AR 0.4 (after Tokunaga, 1933) ***pontophilus*** **Tokunaga**

- Wing with macrotrichiae **2**

2 - Wing without macrotrichiae between veins Cu1 and Cu2; anal point absent; AR 0.2 (after Tokunaga, 1933) ***boodleae*** **Tokunaga**

- Wing with macrotrichiae between Cu1 and Cu2; anal point present; AR 0.4 or higher **3**

3 - Anal point membranous, low and rounded; dorsal appendage very small, with numerous short setae on dorsal side; median appendage very long and stout, reaching to tip of ventral appendage and bears numerous fine hairs; AR 0.5 (after Tokunaga, 1933) ***magnihamatus*** **Tokunaga**

- Anal point chitinized, narrow and apically pointed; dorsal appendage broad, nearly triangular, with 5 short setae; median appendage much shorter than ventral appendage (after Tokunaga, 1933) ***pelagicus*** **Tokunaga**

(2) The ***kirai*** group of genus ***Tanytarsus***

(Anal point without lateral ridges and without spine clusters)

1 - Anal point very short and broad, with numerous short spurs on posterior margin; both dorsal appendage and digitus sickle-like, with pointed apex; median appendage reaching to about middle of ventral appendage, with simple setae only; body brown, with dark brown marks; WL 0.86 mm, AR 0.53, fLR 1.57, fBR 3.2; collected in the middle stream of Oyabe River (after Sasa & Kawai, 1988) ***oyabeparvulus*** **Sasa et al.**

- Anal point longer than wide **2**

2 - Anal point widest at base and not expanded nor forked apically, with smooth dorsal surface; dorsal appendage roughly egg-shaped and with rounded posterior margin **3**

- Anal point nearly parallel-sided and expanded or forked apically; dorsal appendage pointed or constricted caudally **4**

3 - Digitus largely hidden on the ventral side of dorsal appendage, and smoothly curved; median appendage S-shaped and with broad setae apically; frontal tubercles absent; AR 0.55; body largely yellow, WL 1.31 mm, fLR 2.21 (after Sasa et al., 1988) ***oyabelevis*** **Sasa et al.**

- Digitus largely situated on the inner side of dorsal appendage and abruptly curved apically; median appendage nearly straight and with simple setae only; frontal tubercles present; AR 0.97-1.02; body largely yellow, WL 1.44-1.55, fLR 2.31-2.55 (after Sasa & Kawai, 1987) ***kirai*** **Sasa et Kawai**

4 - Anal point expanded subapically like a bulb, and with a small apical process; median appendage short and directed inwards; body largely greenish yellow; WL 1.37-1.65 mm, AR 0.89-1.09, fLR 2.48-2.88, fBR 2.4-2.8 (after Sasa, 1983) ***tamakutibasi*** **Sasa**

- Anal point not expanded subapically, but forked into three apical spurs; median

appendage with long and simple setae directed backwards, apical setae reaching to near apex of ventral appendage; body largely greenish yellow; WL 1.34-1.52 mm, AR 0.97-1.11, fLR 2.59-2.68, fBR 4.0-4.4 (after Sasa & Kawai, 1987) ***biwatrifurcatus* Sasa et Kawai**

(3) The ***usumaensis*** group of genus ***Tanytarsus***

(Anal point with lateral ridges but without spine clusters)

One species, ***T. usumaensis* Pagast, 1931,** was recorded for this group from Japan by Sasa & Kamimura (1987, p.19), from Lake Akan (Hokkaido). WL 2.04-2.40 mm, AR 1.13-1.24, DM 14-22, DL 8-12, PA 1, SC 6-8, VR 1.13-1,29, fLR 1,71-1.96, fBR 3.5-4.8.

(4) The ***oyamai*** group of genus ***Tanytarsus***

(Anal point with lateral ridges and spine clusters; digitus absent or very small)

1 - Antenna with only 10 flagellar segments, AR 0.68-0.69; body greenish yellow, stripes brown; WL 0.92-0.95 mm; ninth tergite with long setae in the middle portion; anal point widest at base and tapering towards pointed tip, with 5-7 spine clusters; dorsal appendage kidney-shaped, digitus absent, ventral appendage very long and slender, median appendage about half as long as ventral appendage (after Sasa, 1980) ***tamaseptimus* Sasa**

\- Antenna with 13 flagellar segments **2**

2 - AR about 0.5; bands of ninth tergite united in the middle; dorsal appendage walnut-shaped, digitus small and not extending beyond inner margin of dorsal appendage; anal point with more than 10 irregularly distributed spine clusters; fLR about 1.5; body pale brown, stripes reddish brown (after Toku-naga, 1938) ***atagoensis* Tokunaga**

\- AR higher than 0.8; bands of ninth tergite separated in the middle; dorsal appendage either egg-shaped or constricted in the middle **3**

3 - Median appendage long, slender and bearing long, simple setae, tip of terminal setae extending to beyond tip of ventral appendage; body yellow, stripes brown; anal point with only two spine clusters; WL 1.90 mm, AR 1.06 (after Sasa & Kikuchi, 1986) ***kikuchii* Sasa et al.**

\- Median appendage shorter, its terminal setae not reaching to tip of ventral appendage **4**

4 - Dorsal appendage roughly egg-shaped, posterior half not constricted, and its long axis is almost parallel to body axis; digitus completely absent; median appendage short and bearing broad lamellar setae with pointed apex **5**

\- Dorsal appendage constricted in the middle, its posterior half narrower than proximal half, and the long axis is oblique to body axis; small digitus present; median appendage bearing simple setae only **6**

5 - Anal point with more than 10 spine clusters distributed irregularly; body largely

dark brown; WL 2.62-2.91 mm, AR 1.31-1.48, fLR 1.64-1.76 (after Sasa & Kamimura, 1987) ***nippogregarius* Sasa et Kamimura**

- Anal point with less than 8 spine clusters distributed on a line; body largely yellow; WL 1.47-1.53 mm, AR 0.86-0.96, fLR 2.59-2.87 (after Sasa & Hasegawa, 1983) ***miyakoflavus* Sasa et Hasegawa**

6 - Median appendage with long setae directed backwards, their tips reaching to almost tip of ventral appendage; body largely dark brown; wing with macrotrichiae rather extensively, including in cells between R4+5 and Cu2; WL 2.55-2.69 mm, AR 1.43-1.58, fLR 2.00-2.04 (after Sasa et Kawai, 1987) ***konishii* Sasa et Kawai**

- Median appendage much shorter and its setae are directed inwards **7**

7 - Body almost uniformly dark brown; wing with small numbers of macrotrichiae on distal 1/3 and only in cells between R4+5/M and M/Cu1; WL 1.45-1.74 mm, AR 0.86-1.12, fLR 1.60-1.72 (after Sasa, 1979) ***oyamai* Sasa**

- Body largely yellow and with brown marks; wing with macrotrichiae more extensively, including cells between Cu1 and Cu2, and behind Cu 8

8 - Wing with numerous macrotrichiae on almost entire surface; anal point with some 5 spine clusters on a line; abdominal tergites almost uniformly yellow; frontal tubercles small, almost as long as wide; WL 1.89 mm, AR 1.38, fLR 2.75; median appendage with more numerous hair tuft (after Sasa & Hasegawa, 1983) ***miyakobrevis* Sasa et Hasegawa**

- Wing with much fewer macrotrichiae, area behind Cu bare except on anal vein; anal point with 8 or more spine clusters distributed irregularly; abdominal tergites II to VI each with a pair of pale areas surrounded by dark lines; frontal tubercles much longer than wide; WL 1.64-1.81 mm, AR 1.18-1.28, fLR 2.33; median appendage with fewer hair tuft (after Sasa & Hasegawa, 1983) ***sakishimanus* Sasa et Hasegawa**

(5) The ***mendax*** group of genus ***Tanytarsus***

(Anal point with lateral ridges and with spine clusters; digitus long; median appendage short or absent)

1 - Median appendage absent; digitus highly twisted; body pale yellow, WL 1.27-1.39 mm, AR 0.62-0.70, fLR 2.37-2.57; anal point long, slender and expanded in the middle, with 3 or 4 spine clusters (after Sasa, 1980) ***tamaoctavus* Sasa**

- Median appendage present; digitus not twisted **2**

2 - Digitus double in structure, composed of a long and spatulate dorsal blade, and a shorter hook-like ventral blade; dorsal appendage swan-shaped, inner margin strongly concave; median appendage short and directed inwards; body dark brown; AR 1.0, ER 0.58, fLR 1.81; frontal tubercles present; wing with macrotrichiae on distal half only (after Sasa, 1980) ***tamadecimus* Sasa**

- Digitus composed of a single blade 3

3 - Dorsal appendage elongate oval and with smoothly rounded posterior margin; digitus almost parallel to inner margin of dorsal appendage and largely hidden behind it; anal point smoothly rounded apically 4

- Dorsal appendage more or less complicated in structure and not smoothly rounded posteriorly; digitus long, stout and extending much beyond posterior margin of dorsal appendage 7

4 - Median appendage short and with many leaf-like, inwards directed setae; body yellow, with brown marks; WL 1.76-1.93 mm, AR 1.02-1.22, fLR 2.44-2.66; frontal tubercles prominent (after Sasa, 1985) ***unagiseptimus* Sasa**

- Median appendage with simple setae only 5

5 - Ventral seta of dorsal appendage at the base of digitus arising from a prominent tubercle; digitus sinuate and with pointed apex; body largely pale yellow, scutal stripes and postnotum slightly brownish; WL 1.47-1.50 mm, AR 0.72-0.77, fLR 3,28 (after Sasa, 1980) ***tamaundecimus* Sasa**

- Ventral seta of dorsal appendage without basal tubercle at base, or absent 6

6 - Body almost entirely pale yellow, scutal stripes slightly brownish; median appendage with stout setae; digitus curved and with pointed apex (after Sasa et al., 1988) ***oyabepallidus* Sasa et al.**

- Body largely brown, scutal stripes and postnotum dark brown; digitus straight and with rounded apex; WL 1.66-2.07 mm, AR 1.00-1.13, fLR 2.61-2.90 (after Sasa & Kikuchi, 1986) ***okuboi* Sasa et Kikuchi**

7 - Anal point triangular, broadest at base and tapering towards pointed apex; dorsal appendage roughly half-egg shaped, inner margin concave and outer margin convex; median appendage very short and with a few medially directed setae; digitus long and curved, directed inwards and apically rounded; WL 1.19 mm, AR 0.60, fLR 2.42 (after Sasa, 1983) ***tamaduodecimus* Sasa**

- Anal point with rounded or truncate apex; dorsal appendage not as above, digitus directed backwards and nearly parallel to body axis 8

8 - Anal point parallel-sided basally but abruptly constricted at about middle; digitus very long, stout and apically rounded, extending much beyond posterior margin of dorsal appendage 9

- Anal point not abruptly constricted in the middle; digitus narrower 10

9 - Anal point with 6-12 spine clusters irregularly distributed; dorsal appendage swan-shaped and with a long, parallel-sided and inwards directed digitus; body largely brown; WL 2.19-2.71 mm, AR 0.98-1.13, fLR 1.97-2.28; small frontal tubercles present, bands of ninth tergite separated (after Sasa, 1985) ***chuzesecundus* Sasa**

- Anal point with 3 or 4 spine clusters situated on a longitudinal line; dorsal appendage with three pointed processes on posterior margin; body largely pale yellow; WL 1.33-1.48 mm, AR 0.82-0.90, fLR 2.60-2.77; small frontal tubercles present, bands of ninth tergite separated (after Sasa et al. 1988) ***oyaberotundus* Sasa et al.**

10- Dorsal appendage gradually tapering towards rounded apex; digitus narrow,

slender and tapering towards pointed apex; ventral appendage clubbed apically; body yellow, with dark brown or brown marks; frontal tubercles prominent; WL 2.04-2.60 mm, AR 1.22-1.55, fLR 2.03-2.26 (after Sasa & Kawai, 1988d) ***mendax*** **Kieffer**

- Dorsal appendage abruptly narrowed near apex, forming a neck and a small head; digitus broader and with rounded apex; ventral appendage not expanded apically **11**

11- Dorsal appendage with 9 setae on dorsal side, and a long basomedial seta arising from a large cylindrical tubercle; WL 2.09-2.31 mm, AR 1.05-1.17, fLR 1.83-1.93; body largely dark brown (after Sasa & Kamimura, 1987) ***akantertius*** **Sasa et Kamimura**

- Dorsal appendage with 6 setae on dorsal side, and a basomedial seta arising from a small tubercle; WL and AR smaller, fLR larger **12**

12- Digitus slender, parallel-sided and with rounded apex; dorsal appendage strongly hooked at apex; two dorsomedial setae on dorsal appendage arising each from a triangularly produced bases; WL 1.42-1.50 mm, AR 0.83-0.87, fLR 2.44-2.68 (after Sasa, 1983) ***tamagotoi*** **Sasa**

- Digitus wider at base and abruptly narrowed near apex; dorsal appendage with stouter neck; two dorsomedial setae on dorsal appendage arising from smaller bases; body largely yellow; WL 1.76-1.79 mm, AR 1.04-1.10, fLR 2.81-1.89 (*miike*-form of *tamagotoi*, Sasa, 1985b) ***miikegotoi*, sp. nov.**

(6) The ***yunosecundus*** group of genus ***Tanytarsus***

1 - Spine clusters on anal point situated on a longitudinal line; frontal tubercles prominent; wing with macrotrichiae on almost entire surface **2**

- Spine clusters on anal point irregularly distributed; frontal tubercles absent; wing with macrotrichiae on distal portion only **3**

2 - Dorsal appendage egg-shaped, not constricted near apex; gonocoxite with a broad, rectangular lobe at the base of ventral appendage; WL 2.07-2.18 mm, AR 1.13-1.17, DM 8-12, fLR 2.33-2.39 (after Sasa, 1984) ***yunosecundus*** **Sasa**

- Dorsal appendage constricted at about middle and narrowed on distal half; gonocoxite without inner lobe; WL 1.46-1.58 mm, AR 1.00-1.14, DM 0, fLR 3.18 (unusually high) (after Kawai & Sasa, 1985) ***takahashii Kawai et*** **Sasa**

3 - Body largely pale yellow; dorsal appendage roughly U-shaped, with a conspicuous basal projection bearing two dorsal and one long ventral setae; WL 1.15-1.55 mm, AR 0.70-1.02, fLR 2.26-2.41 (significantly larger), fBR 3.3-5.2 (after Sasa, 1984C) ***unagisextus*** **Sasa**

- Body largely dark brown; dorsal appendage with slightly concave inner margin, without conspicuous basal process; WL 1.39-1.59 mm, AR 0.89-1.07, fLR 1.56-1.82, fBR 3.0-4.6 (after Sasa, 1988) ***utonaiquartus*** **Sasa**

10. Genus *Yuasaiella* Tokunaga, 1938

One species, ***kyotoensis Tokunaga*, 1938**, was recorded from Mount Hiei (Kyoto). This genus is characterised by that front tibia without terminal spur, and terminal combs of middle and hind tibiae are composed of very short, free spurs, not fused combs such as seen in most other Tanytarsini species. BL 3.8 mm, AR 0.77; eyes reniform, ER 1.58; front tibia longer than front tarsus I, fLR 0.82 (after Tokunaga, 1938)

11. Genus *Zavrelia* Kieffer, 1920

One species, ***kibunensis* Tokunaga, 1938**, was recorded from Kibune (Kyoto). This species is characterized by eyes being reniform (ER about 1.5) and pubescent, and antenna has only 11 flagellar segments, AR 0.28-0.3 (after Tokunaga, 1938).

B. Subfamily ORTHOCLADIINAE

Key to tribes

1 - Postnotum without median groove or keel; larvae found in sea water **Tribe CLUNIONINI P.136**
- Postnotum with a median longitudinal groove or keel **2**

2 - Vein R1 and R4+5 fused with the thickened costa: larvae in freshwater **Tribe CORYNONEURINI P.134**
- Vein R1 and R4+5 separated from costa as usual **3**

3 - Vein Cu2 almost straight or curved only at tip; antepronotum normally developed; dorsomedian setae of scutum weakly developed or absent; wing membrane, if without macrotrichiae, never granular; squama usually with fringe hairs (squama is bare in *Diplocladius*, and some *Eukiefferiella*); larvae in freshwater **Tribe ORTHOCLADIINI P.109**
- Not with the above combination; Cu2 more or less strongly curved in the middle (Exception: *Metriocnemus*); antepronotum more or less reduced; dorsomedian setae of scutum often well developed; wing membrane often granular; squama with only a few or no fringe hairs, rarely thickly fringed (*Chaetocladius*, *Metriocnemus*); larvae in freshwater or terrestrial **Tribe METRIOCNEMINI P.109**

Tribes ORTHOCLADIINI and METRIOCNEMINI

Key to genera

1 - Scutum with a conspicuous median longitudinal fissure; antenna 5 or 6 segmented both in male and female; wing with conspicuous dark marks (5 spp.) ***Chasmatonotus* Low P.113**
- Scutum without median longitudianl fissure; male antenna composed usually of 13 flagellar segments **2**

2 - Gonostylus bilobed at apex, or deeply forked into two parallel arms; inner lobe of gonocoxite long, slender and finger-like (the *Brillia* complex) 3

- Gonostylus not deeply forked or bilobed at apex, usually simple; inner lobe of gonocoxite absent, or when present, much shorter and hardly as long as wide 5

3 - Gonostylus in a form of a boxing glove, the inner arm broad and forming a groove with the outer arm; gonocoxite with two long, finger-like inner lobes; wing membrane bare (1 sp.) ***Tokunagayusurika*** **Sasa** **P.113**

- Gonostylus forked into two long, slender arms; gonocoxite with one finger-like inner lobe 4

4 - Wing membrane with macrotrichiae (3 spp.) ***Brillia*** **Kieffer** **P.112**

- Wing membrane bare (1 sp.) ***Diplocladius*** **Kieffer** **P.113**

5 - Gonostylus with a long posterolateral process, and somewhat V shaped; squama fringed (2 spp.) ***Toyamayusurika*** **Sasa et Kawai** **P.133**

- Gonostylus simple and without a long process 6

6 - Middle tibia with a terminal comb composed of several free spurs (1 sp.) ***Okinawayusurika*** **Sasa et Hasegawa** **P.128**

- Middle tibia without a terminal comb 7

7 - Wing membrane with macrotrichiae 8

- Wing membrane without macrotrichiae 10

8 - Vein Cu2 strongly curved in the middle (eyes bare, each with a strong dorsomedial projection; both dorsomedian and dorsolateral setae on scutum welldeveloped; squama fringed; anal point robust, with lateral setae and covered by microtrichiae (2 spp.) ***Parametriocnemus*** **Goetghebuer** **P.129**

- *Vein Cu2 almost straight* 9

9 - Costa ending at tip of R4+5 (1 sp.) ***Heterotrissocladius*** **Sparck** **P.120**

- Costa extending beyond tip of R4+5 (4 spp.) ***Metriocnemus*** **van der Wulp** **P.127**

10- Tarsi IV of all legs bilobed, much shorter than tarsi V (3 spp.) ***Cardiocladius*** **Kieffer** **P.118**

- Tarsi IV of all legs cylindrical, as long as or longer than tarsi V 11

11- Antenna with a distinct apical seta; squama bare; Cu2 strongly curved; with long and narrow anal point; eyes pubescent or bare (17 spp.) ***Smittia*** **Holmgren** **P.131**

- Without above combination of characters; antenna rarely with a distinct apical seta 12

12- Eyes pubescent 13

- Eyes bare 19

13- Squama bare 14

- Squama fringed (the *Cricotopus* complex) 15

14- Scutum with 40-60 dorsolateral setae and 30-40 prealar setae in multiple rows but without dorsomedian setae; Cu2 strongly curved; anal point absent or very small (1 sp.) ***Heleniella*** **Gowin** **P.126**

- Scutum with less than 15 dorsolateral setae in a single row, and 3 or 4 prealar

setae, dorsomedian setae absent; Cu2 almost straight; anal point absent or hyaline (13 spp. in total)

Eukiefferiella **Thienemann (in part) P.119**

15- Dorsolateral setae of scutum all minute, arising from small, indistinct pits **16**

- Dorsolateral setae of scutum long and stout as usual, arising from largepale pits **17**

16- Anal point absent or minute; abdominal tergites and legs usually with conspicuous dark and pale markings (31 spp.)

Cricotopus **van der Wulp P.113**

- Anal point robust, often with lateral setae; body entirely dark (1 sp.)

Paracladius **Hirvenoja P.117**

17- Anal point absent, or very small (3 spp.)

Paratrichocladius **Santos Abreu P.117**

- Distinct anal point present **18**

18- Anal point robust and bearing lateral setae; humeral pits often very large(4 spp.)

Rheocricotopus **Thienemann P.118**

- Anal point slender and without lateral setae; humeral pits minute (2 spp.)

Nanocladius **Kieffer P.117**

19- Pulvilli well developed; squama fringed **20**

- Pulvilli absent or vestigial **23**

20- Anal point absent, or when present, small and without lateral setae; Cu2 strongly curved; pulvilli small **21**

- Anal point long, widest at base and tapering towards apex, with lateral setae; Cu2 almost straight; pulvilli very large and wide; wing membrane smooth; (3 spp.) ***Psectrocladius*** **Kieffer P.125**

21- Wing membrane granular; costa not produced beyond tip of R4+5 **22**

- Wing membrane smooth; costa produced beyond tip of R4+5; anal point absent, or triangular and with strong setae (4 spp.)

Pseudorthocladius **Goetghebuer P.130**

22- Anal point long, slender and bare; dorsomedian setae of scutum present though very small (1 sp.) ***Chaetocladius*** **Kieffer P.125**

- Anal point low and rounded, with marginal setae; dorsomedian setae absent (1 sp.) ***Parachaetocladius*** **Goetghebuer P.128**

23- Squama bare **24**

- Squama fringed **27**

24- Gonostylus with a small pointed subapical process on lateral side; both anal point and inner lobe of gonocoxite absent (1 sp.)

Okayamayusurika **Sasa P.128**

- Gonostylus without subapical process on lateral side; inner lobe of gonocoxite present **25**

25- Anal point absent; inner lobe of gonocoxite low, broad and rounded; scutum with dorsomedian setae but without central tubercle; tip of R4+5 distal to tip of Cu1; female antenna long, with 10 flagellar segments; cercus rhombic, much longer than wide (2 spp.) ***Tsudayusurika*** **Sasa P.134**

- Anal point usually present; inner lobe of gonocoxite not as above; scutum with a median tubercle bearing two minute setae, but without dorsomedian

setae; tip of R4+5 proximal to tip of Cu1; female antenna with 4 or 5 flagellar segment; cercus wider than long or circular **26**

26- Costa not or only slightly extending beyond tip of R4+5 ***Pseudosmittia*** **Goetghebuer P.130**

\- Costa extending much beyond tip of R4+5 ***Parakiefferiella*** **Thienemann P.128**

27- Wing membrane coarsely granular; Cu2 strongly curved; squama with 1-8 fringe hairs; costa extending much beyond tip of R4+5; Cu2 strongly curved; anal point very low and rounded, or absent; inner lobe of gonocoxite usually longer than wide; scutum often with lamellar setae (14 spp.) ***Limnophyes*** **Eaton P.126**

\- Wing membrane smooth; anal point, when present, much longer than wide; scutum without lamellar setae **28**

28- Anal point with lateral setae; costa not or only slightly extending beyond tip of R4+5 (16 spp.) ***Orthocladius*** **van der Wulp P.120**

\- Anal point without lateral setae, or absent; costa usually extending beyond tip of R4+5 **29**

29- Anal point short, triangular; tip of antenna bearing several long, curved setae (1 sp.) ***Synorthocladius*** **Thienemann P.125**

\- Anal point absent, or if present it is transparent and easily overlooked; antenna without curved apical setae **30**

30- Eyes with wedge-shaped dorsomedial projection; anal lobe of wing strongly produced inwards; tip of R4+5 distal to tip of Cu1; anal point absent; virga present; pupa without thoracic horn (1 sp.) ***Tokunagaia*** **Saether P.125**

\- Eyes without distinct dorsomedial projection; anal lobe of wing not produced inwards; tip of R4+5 often proximal to tip of Cu1; anal point absent, or if present, it is transparent; pupa with thoracic horns (13 spp. in total) ***Eukiefferiella*** **Thienemann** (in part) **P.119**

BA(A). The ***Brillia*** complex

1. Genus ***Brillia*** Kieffer, 1913

1 - Inner branch of gonostylus about as long as outer branch; AR 1.08-1.12; abdominal tergites almost uniformly brown, ninth tergite without reticular marks (after Tokunaga, 1939) ***modesta*** **(Meigen)**

\- Inner branch of gonostylus much shorter than outer branch; abdominal tergites not uniformly brown: ninth tergite with reticular marks 2

2 - Inner branch of gonostylus less than half the length of outer branch; WL 2.70-2.81 mm, AR 1.52-1.67, ER 0.43-0.63, DM 0. DL 68-82, PA 20-26, SC 64-75, SQ 40-46, RR 0.17-0.24, VR 1.24-1.36, fLR 0.82-0.86, fBR 3.5-4.1; abdominal tergites II-V dark brown laterally and with a pale longitudinal band along midline (after Sasa & Kawai, 1987b) ***longifurca*** **Kieffer**

\- Inner branch of gonostylus about 2/3 the length of outer branch; WL 1.80-2.27 mm, AR 0.54-0.76, ER 0.16-0.22, DM 0, DL 58-80. PA 14-23. SC 40-61, SQ

22-27, fLR 0.80-0.83, fBR 3.1; abdomen distinctly banded, basal half of abdominal tergites II to V dark brown, distal half yellow (after Sasa, 1981) ***japonica* Tokunaga**

2. Genus ***Diplocladius*** Kieffer, 1908

One species, ***cultriger*** Kieffer, 1908 was recorded from Tochigi, Niigata and Toyama. WL 2.10-2.26 mm, AR 1.68-1.91, ER 1.00-1.33, DM 6-8 (all minute), DL 4-6, SC 4-6, fLR 0.75-0.79, fBR 3.0-4.2 (after Sasa, 1984)

3. Genus ***Tokunagayusurika*** Sasa, 1978

One species, *akamusi* (Tokunaga, 1938) is recorded. This species is the most important chironomid found in enormous quantities in all the eutrophicated lakes in Japan, and the adults emerge during November to early December, often causing serious nuisance. Large dark brown midge, WL 5.14-5.48 mm, ER 1.17-1.48, AR 2.75-3.18, PN 16-28, DM 0, DL 26-41, SC 16-24, VR 1.10-1.13, fLR 0.74- 0.77, fBR 3.0-3.8 (after Sasa & Kawai, 1987a).

BA(B). The ***Chasmatonotus*** complex

1. Genus ***Chasmatonotus*** Low, 1864

Five species were recorded by Yamamoto (1980, 1985).

BA(C). The ***Cricotopus*** complex

1. Genus ***Cricotopus*** van der Wulp, 1874

1 - Gonostylus directed backwards parallel to body axis like in Chironominae species and not folded into inner groove of gonocoxite; gonostylus with rod-like basal process bearing long setae; inner lobe of gonocoxite double and highly complicated in structure (5 spp.)
(3) subgenus ***Pseudocricotopus*** Nishida **P.116**

\- Gonocoxite directed outwards, while gonostylus directed inwards, and being folded into inner groove of gonocoxite, as usual in most Orthocladiinae; gonostylus simple and without basal process; inner lobe of gonocoxite absent, or simple in structure **2**

2 - Pulvilli absent; inner margin of gonocoxite flattened or slightly rounded basally (22 spp.) (1) subgenus ***Cricotopus*** s. str. **P.114**

\- Pulvilli present; inner margin of gonocoxite procuced to form a hump basally (4 spp.) (2) subgenus ***Isocladius*** Kieffer **P.116**

Note. Subgenera *Cricotopus* and *Isocladius* can more clearly be differenciated by the structure of "pecten epipharyngis" of larva (cf. Hirvenoja, 1973, p.135).

(1) Subgenus ***Cricotopus***, s. str.

1 - Gonocoxite without inner lobe 2
- Gonocoxite with inner lobe(s) 4

2 - Tergites I, IV and VII entirely pale, III and IV largely black, and II and Vwith a pale band along oral margin; front and middle tibia white in the middle, hind tibia darker in the middle; gonocoxite without strong setae along inner margin; WL 1.28-1.37, AR 0.97-1.00, fLR 0.63-0.66, fBR 1.6 (after Sasa, 1981) ***metatibialis*** **Tokunaga**
- Tergites I and IV pale, VII largely or entirely dark **3**

3 - Tergites I, IV and IX yellow, other tergites entirely black; all tibiae with a white ring in the middle, that on front tibia about half the length of the segment; WL about 3 mm; gonocoxite without strong setae along inner margin (after Edwards, 1929, Tokunaga, 1940) ***trifascius*** **Edwards**
- Tergites I, IV and IX white, II. III, V, VI and VII largely black but with a pale band along oral margin; all tibiae with a wide white ring in the middle, that on front tibia extending 2/3 the length of the segment; gonocoxite with a row of strong setae along inner margin; WL 1.95 mm, AR 1.43, fLR 0.68, fBR 1.4 (after Sasa, 1981) ***tamasimplex*** **Sasa**

4 - Inner lobe of gonocoxite distinctly double; femora largely dark, tibiae with a long pale ring in the middle **5**
- Inner lobe of gonocoxite single (small accessory lobe may be present) **7**

5 - Abdominal tergites entirely black; inner lobes of gonocoxite both well developed, roughly semicircular, the proximal lobe bearing strong setae; gonostylus with an acutely angulate subapical tooth; WL 2.01-2.17 mm, AR 0.71-0.78, fLR 0.55-0.60, fBR 1.8-2.2 (after Sasa, 1988) ***osaruquartus*** **Sasa**
- Abdominal tergites not entirely black; inner lobes of gonocoxite smaller and narrower; gonostylus without such an acute angular subapical tooth **6**

6 - Tergites I and II pale, the remainders entirely or largely dark; WL 1.62-1.78 mm, AR 1.18-1.28, DM 16-20, DL 14-16, PA 4, SC 6, fLR 0.66-0.70, fBR 2.4-2.5 (after Sasa & Kawai, 1988d) ***tokunagai*** **Hirvenoja**
- Tergite I pale, II largely dark and narrowly pale along inner margin, IV and V largely pale and with a dark band along caudal margin, the remaining tergites dark; WL 1.35-1.52 mm, AR 1.22-1.34, DM 14-20, DL 8-14, SC 6-8, SQ 6-8, fLR 0.58-0.63, fBR 2.2-2.5 (after Sasa, 1983) ***triannulatus*** **(Macquart)**

7 - Abdominal tergites almost entirely dark **8**
- Some abdominal tergites distinctly pale **10**

8 - Leg segments almost uniformly dark **9**
- All tibiae with a long pale ring in the middle occupying about 2/3 of the segment; WL 1.52-1.76 mm, AR 0.91-1.20, ER 1.21-1.43, DM 18-25, DL 32-43, PA 4-6, SC 24-40, SQ 5-6, fLR 0.53-0.55, fBR 1.9-2.1 (after Sasa, 1984) ***yunoquintus*** **Sasa**

9 - Tergites IV somewhat paler than the other tergites; tergite IX with some 10 setae in the middle, but without setae on posterior margin (after Sasa, 1981)

tamapullus **Sasa**

\- Tergites almost uniformly black; tergite IX with a pair of lobes in the middle of posterior margin, bearing strong setae; WL 1.47-1.95 mm, AR 0.94-1.16; fLR 0.54 (after Sasa, 1979) ***yatabensis*** **Sasa**

10- Tergites I and II pale, other tergites entirely or largely dark **11**

\- Tergites I and IV pale **14**

11- Leg segments entirely brown or dark brown; R2+3 ending closer to end of R4+5 than to end of R1, RR larger than 0.5; inner lobe of gonoxocite somewhat conical and with a small accessory lobe on distal margin; AR about 1.35, WL about 1.8 mm (after Tokunaga, 1936)

flavibasalis, **Tokunaga**

\- All tibiae with a conspicuous pale ring in the middle; R2+3 ending about midway between ends of R1 and R4+5; inner lobe of gonocoxite simple **12**

12- AR larger than 1.0 **13**

\- AR 0.37-0.40; inner lobe of gonocoxite longer than wide and with rounded margin; WL 1.39-1.61 mm, fLR 0.62, fBR 1.9-2.2 (after Sasa et al., 1988)

jogantertius **Sasa et al.**

13- Tarsi II and III of all legs entirely or largely white, I, IV and V black; inner lobe of gonocoxite longer than wide and rounded; BL 3.0 mm, AR 1.5; (after Tokunaga, 1940, Pinder, 1978, p.60) ***tremulus*** **(Linnaeus)**

\- Tarsi entirely brown; inner lobe of gonocoxite much broader than high; WL 1.29-1.56 mm, AR 1.14-1.31, fLR 0.62-0.69 (after Kawai & Sasa, 1985)

brevilobus Kawai et **Sasa**

14- Tergite V entirely black; inner lobe of gonocoxite narrow and conical **15**

\- Tergite V largely pale (tergites I, IV and V largely pale, IV and V pale brown on lateral sides, IX entirely dark); inner lobe of gonocoxite with a broad inner edge; BL 2.0 mm, AR 1.0, RR larger than 0.5, fLR 0.62; gonostylus with a broad subapical swelling (after Tokunaga, 1936)

bifascius **Tokunaga**

15- Tergite VII largely dark **16**

\- Tergites I, IV and VII pale; femora largely dark, tibiae with a broad pale ring in the middle, tarsi dark; BL 2.5 mm, AR 1.1-1.2, fLR 0.70 (after Tokunaga, 1936) ***polyannulatus*** **Tokunaga**

16- Tergite II largely dark **17**

\- Tergite II largely pale and with a pair of black patches; I and IV also largely or entirely pale; BL 1.4-1.6 mm, AR 1.2, RR 0.5, fLR 0.68; proximal half of femora pale, tibiae with broad pale ring in the middle; inner lobe of gonocoxite simple, longer than wide (after Tokunaga, 1936)

bimaculatus **Tokunaga**

17- Pale bands on tergites I and IV yellow, tibial rings white (BL 3.0-3.7 mm, WL 1.9-2.2 mm, AR 1.3-1.5, fLR 0.61; femora largely dark, tibiae with broad pale ring in the middle; inner lobe of gonocoxite longer than wide; gono-stylus without subapical tooth (after Sasa, 1979)

bicinctus **(Meigen)**

\- Pale abdominal bands on tergites I and IV pale brown, tibial rings yellow or

brown (BL 1.7-2.0, WL 1.1-1.3 mm, AR 0.67-0.7, fLR 0.51; inner lobe of gonocoxite simple and longer than wide, gonostylus with subapical swelling (after Tokunaga, 1936) ***yoshimurai*** **Tokunaga**

(2) Subgenus ***Isocladius*** Kieffer, 1909

1 - Inner lobe of gonocoxite composed of double processes; tergites I, IV and V largely white, II, III and VII each with a white band along oral margin: WL 1.58 mm, AR 1.16, fLR 0.61 (after Sasa, 1981)
tamannulatus Sasa
- Inner lobe of gonocoxite composed of single process 2
2 - Tergite VII may be pale, other tergites largely dark
sylvestris **(Fabricius), dark form**
- Tergites I, IV and VII pale 3
3 - Median stripe of scutum long, reaching to near posterior margin of scutum; femora largely dark, with a narrow basal pale ring; WL 1.71 mm, AR 1.53, fLR 0.58, fBR 1.5 (after Sasa, 1981) ***tricinctus*** **(Meigen)**
- Median stripe of scutum short, prescutellar area pale; femora largely pale, with a narrow apical dark ring 4
4 - Tergite V largely or entirely pale; BL 2.89-3.42 mm, WL 1.79-2.13 mm, AR 1.38-1.52, fLR 0.54 (after Sasa, 1979)
sylvestris **(Fabricius), pale form**
- Tergite V largely or entirely dark; WL 1.95-2.24 mm, AR 1.65-1.87, fLR 0.55-0.57, fBR 1.9-2.7 (after Sasa, 1984) ***trifasciatus*** **(Panzer)**

Note 1: Sasa (1983) recorded two forms of *C. trifasciatus* from River Tama, which can be differentiated by the following key:
5 - Tergite IV and VII entirely pale; WL 1.88-1.96 mm, AR 1.63-1.98, fLR 0.54-0.58, fBR 1.2-2.2 ***yoroi*** **form**
- Tergite IV with a large central dark patch, VIII with a basal dark band; WL 1.52-1.75 mm, AR 1.29-1.52, fLR 0.51-0.56, fBR 1.6-2.3
noge **form**

Note 2: ***Cricotopus taiwanus*** **Tokunaga, 1940** was recroded only by female from Sizyukei (Taiwan). BL 1.8 mm, legs with pulvilli, color as in *C. nitens* (Kieffer), antenna 6 segmented, abdominal tergites I and IV and VII yellow, II, V and VI dark and narrowly yellow on anterior margin, other tergites black.

(3) Subgenus ***Pseudocricotopus*** Nishida, 1987

1 - Crista dorsalis ("megaseta" of Nishida, 1987) situated in the basal portion of gonostylus, apical portion free from strong setae 2
- Crista dorsalis situated in the subapical portion of gonostylus, as usual 3
2 - Abdominal tergites I and II white, other tergites black; front tibia with a long pale ring in the middle; anal point small, apically pointed, hyaline and easily overlooked; WL 2.24 mm, AR 1.18, fLR 0.56, fBR 2.7, DM 20, DL 21:

24 (after Sasa & Kamimura, 1987) ***montanus*** **Tokunaga**

- Abdominal tergites and front tibia entirely black; anal point absent; WL 1.76 mm, AR 1.78, fLR 0.68, fBR 2.5, DM 10, DL 12 (after Sasa & Kawai, 1987) ***matudigitatus*** **Sasa et Kawai**

3 - Anal point absent; basal appendage of gonostylus bearing a long apical seta; WL 1.51-1.95 mm, AR 0.91-1.12, sc 8-12, fLR 0.62-0.68, fBR 1.6-1.8; crista dorsalis of gonostylus short and apically rounded (after Sasa, 1981) ***tamadigitatus*** **Sasa**

- Anal poignt present; basal appendage of gonostylus bearing short apical setae 4

4 - Anal point with rounded apex; crista dorsalis long, narrow and apically pointed; gonocoxite with two low and broad inner lobes, the dorsal one triangular; WL 1.71-2.24 mm, AR 0.57-0.73, SC 19.37, fLR 0.61-0.71, fBR 2.1-3.0 (after Nishida, 1987) ***nishikiensis*** **Nishida**

- Anal point with pointed apex; crista dorsalis short, stout and apically rounded; dorsal lobe of gonocoxite roughly quadrangulate; WL 1.92, AR 0.69, sc 16, fLR 0.63, fBR 2.0 (after Sasa, 1988a) ***osarudigitatus*** **Sasa**

2. Genus *Nanocladius* Kieffer, 1913

1 - Inner lobe of gonocoxite rectangular; abdomen entirely black; abdominal tergites III to VI with 8 setae; WL 1.00-1.21 mm, AR 0.62-0.82, DM 2 (minute), DL 4-6, PA 1 or 2, SC 2 or 3, SQ 3-5, fLR 0.61-0.68, fBR 2.7; pulvilli well developed (after Sasa, 1981) ***tamabicolor*** **Sasa**

- Inner lobe of gonocoxite conical; abdominal tergites VI and VII with a pale distal band; abdominal tergites III-V with 10-12 setae; WL 1.4 + 0.05 mm, AR 0.8 + 0.05, DM 0, DL 5-7 (after Ree & Kim, 1981) ***seoulensis*** **(Ree et Kim)**

3. Genus *Paracladius* Hirvenoja, 1973

One species, ***akansextus*** Sasa et Kamimura, was recorded from Lake Akan (Hokkaido). Body largely dark brown, WL 2.30-2.40 mm, ER 0.73-0.78, AR 1.26-1.31, DM 24-26, DL 24-30, PA 4-6, SC 10, fLR 0.71-0.74, fBR2.3-2.7.

4. Genus *Paratrichocladius* Santos Abreu, 1918

1 - Small anal point present, semiglobular and covered with microtrichiae; R4+5 ending proximal to tip of Cul; WL 1.07 mm, ER 1.27, AR 0.38, DM 10 (all minute), DL 8, PA4, SC8, SQ 5, RR 0.45, VR 1.16, R/Cu 0.97, fLR 0.63, fBR 2.4 (after Sasa et al., 1988) ***oyabeangulatus*** **Sasa et al.**

- Anal point absent; R4+5 ending above tip of Cul 2

2 - AR 0.98-1.22; abdominal tergites with smaller numbers of setae, the lateral setae on tergites III and IV usually 4 (range 3-8, mean 5.1), tergite IX with 2-9 (average 5.2) setae; female antenna composed of a pedical and 5 flagellar segments, spermathecae long and nearly cylindrical; breeding in unpollut-

ed, upstream part of river (after Sasa, 1981) ***tamaater*** **Sasa**

- AR 1.28-1.60; abdominal tergites with larger numbers of setae, the lateral setae on tergites III and IV 7-14 (mean 10.5 and 9.8), tergite IX with 8-14setae; female antenna composed of a pedical and 6 flagellar segments; spermathecae roughly globular;breeding in lower and more polluted part of river(after Sasa, 1979) ***rufiventris*** **(Meigen)**

5. Genus ***Rheocricotopus*** Thienemann et Harnisch, 1933

1 - Scutum with a pair of large humeral pits; gonostylus not expanded subapically; pulvilli well developed **2**

- Humeral pits minute; gonostylus expanded subapically **3**

2 - Gonostylus abruptly curved inwards near apex; inner lobe of gonostylus simple and rounded; costa not extending beyond tip of R4+5; WL 1.35-1.68 mm, AR 1.18-1.38, DM 0, DL 10-16, PA 3-4, SC 10-12, SQ 6-10, RR 0.48-0.55, VR 1.06-1.16, R/Cu 1.02-1.08, fLR 0.64-0.67, fBR 1.8-3.5 (after Sasa & Hasegawa, 1988) ***chalybeatus*** **(Edwards)**

- Gonostylus not curved near apex; inner lobe of gonostylus with a claw-like process; costa extending beyond tip of R4+5; WL 1.69-2.08 mm, AR 1.10-1.28, fLR 0.73-0.74, fBR 1.4-2.1 (after Sasa, 1981) ***tamahumeralis*** **Sasa**

3 - Pulvilli well developed; AR 0.38; costa strongly produced beyond tip of R4+5; inner lobe of gonocoxite broad and rounded; gonostylus with a narrow and rectangular subapical tooth; BL 1.81 mm, WL 0.97 mm, fLR 0.70, fBR 1.5; body largely dark brown (after Sasa, 1983) ***tamabrevis*** **Sasa**

- Pulvilli absent; AR about 1.1; costa not extending beyond tip of R4+5; inner lobe of gonocoxite triangular; gonostylus broadly expanded subapically: BL 3.0 mm; body entirely black (after Tokunaga, 1939) ***intermedius*** **(Tokunaga)**

BA(D). The ***Orthocladius*** complex

1. Genus ***Cardiocladius*** Kieffer, 1912

1 - Abdominal tergites all black; tarsi IV very short and wide (width/length= 0.58). and about 0.55 times as long as tarsus V in the hind leg; AR 1.48 (after Tokunaga, 1939) ***capusinus*** **(Zetterstedt)**

- Abdominal tergites I, or I and II paler than the rest tergites; tarsi IV relatively longer, though much shorter than tarsi V 2

2 - Abdominal tergites I and II yellow, other tergites black; tarsus IV of hind leg relatively long, width/length 0.75 (after Tokunaga, 1939; recorded by female only ***fuscus*** **Kieffer**

- Abdominal tergites I dark brown, other tergites black; tarsus IV of hind leg intermediate between the above two species in relative length, width/length 0.69 (after Tokunaga, 1939; described by female only) ***esakii*** **Tokunaga**

2. Genus ***Eukiefferiella*** Thienamann, 1926

1 - Vein R2+3 nearly or completely in contact with R4+5; tip of R4+5 usually proximal to tip of Cul (R/Cu smaller than 1.0); anal point absent **2**
- Vein R2+3 separated rom both Rl and R4+5, ending about midway or closer totip of Rl; tips of R4+5 and Cul on almost same level; anal point absent or present **8**

2 - Squama bare **3**
- Squama with fringe hairs **6**

3 - Eyes pubescent; R4+5 ending proxomal to end of Cul; fCu far distal to r-m **4**
- Eyes bare; wing venation variable **5**

4 - Ninth tergite with an arched ridge bearing three strong setae; body largely black; WL 1.02 mm, AR 0.83-0.88, R/Cu 0.86, VR 1.46, fLR 0.45 (after Sasa et al., 1988) ***oyaberadiata*** **Sasa et al.**
- Ninth tergite without strong setae; body largely yellow, with brown marks; WL 1.14-1.21 mm, AR 0.31-0.42, R/Cu 0.83, VR 1.40-1.58 (after Sasa & Kawai, 1987b, Sasa, 1988a) ***coerulescens*** **(Kieffer)**

5 - Anal point absent; gonocoxite with a prominent inner lobe; body yellow, with brown marks; WL 1.27-1.34 mm, AR 0.78-0.88, DM 0, VR 1.32-1.35, R/Cu 0.87-0.90, fLR 0.79-0.81 (after Sasa & Hasegawa, 1988) ***yaraensis*** **Sasa et Hasegawa**
- Anal point present, somewhat bottle-shaped and with lateral setae; gonocoxite without inner lobe; body almost black; WL 0.9-1.0 mm, AR about 0.4, fCu beyond r-m (after Tokunaga, 1939) ***takahashii*** **(Tokunaga)**

6 - Anal point roughly triangular, widest at base and apically pointed; body yellow, with brown marks; WL 1.05-1.08 mm, AR 0.37-0.38, VR 1.27, fLR 0.86-0.89 (after Sasa, 1981) ***tamaflava*** **Sasa**
- Anal point absent **7**

7 - Body yellow, with brown marks; WL 1.64-1.67 mm, AR 0.44-0.52, fLR 0.73; inner lobe of gonocoxite double, the dorsal lobe quadrangular and longer than wide, the ventral lobe low and broad; gonostylus not swollen medially; collected from a montain stream (after Sasa, 1979) ***yasunoi*** **Sasa**
- Body dark brown; WL 2.64-2.76 mm, AR 1.68-1.72; inner lobe of gonocoxite single, elongate subtriangular; gonostylus swollen medially (after Tokunaga, 1964) ***yosiii*** **(Tokunaga)**

8 - Legs with large pulvilli; body entirely black; BL 2.7-3.0 mm, AR 1.3, fCu far beyond r-m, squama with several fringe setae, anal point absent, gonocoxite with triangular inner lobe; thoracic horn of pupa long, swollen basaly and tapering towards apex (typical to pupae of genus *Eukiefferiella*) (afterTokunaga, 1939) ***tentoriola*** **(Tokunaga)**
- Pulvilli absent or vestigial **9**

9 - Ninth tergite with a long, hyaline, and apically pointed anal point, and a broad setigerous median erection; body brown, with dark brown marks; WL 3.04 -3.28 mm, AR 2.0-2.2, squama with about 10 fringe setae, VR about 1.0, R/Cu larger than 1.0; inner lobe of gonocoxite low and broad; col-

lected on snow (after Tokunaga, 1964) ***nagaokensis*** **(Tokunaga)**

- Ninth tergite without anal point and without setigerous erection **10**

10- Ninth tergite with many long setae on and near posterior margin **11**

- Ninth tertgite without long setae on and near posterior margin **12**

11- Posterior margin of ninth tergite strongly produced in the middle; gonocoxite with two broad inner lobes; gonostylus with a large rectangular subapical tooth; WL 2.38-2.48 mm, AR 2.06-2.22, DM 0, DL 6-8, SQ 17-40, RR 0.33-0.44; fLR 0.73-0.78, fBR 2.0-2.7 (after Sasa & Kawai, 1987a) ***biwaquarta*** **Sasa et Kawai**

- Posterior margin of ninth tergite concave in the middle and with two lobes; gonocoxite with a large conical inner lobe; BL 3.7 mm, AR 1.12 (after Tokunaga, 1939; *Tokunagaia*) ***kibunensis*** **(Tokunaga)**

12- AR smaller than 1.0 **13**

- AR 2.08; ninth tergite with a broad and rounded ridge bearing some 12 long setae; inner lobe of gonocoxite small and like tip of finger; body entirely dull black; WL 1.62 mm, ER 1.32, DM 6, DL 11:12, PA 5, SC 8, SQ 8, fLR 0.54 (after Sasa, 1985c) ***fujisexta*** **Sasa**

13- Ninth tergite without long setae in the middle portion, posterior margin concave medially and with two conspicuous lobes; body dark brown and with black marks; WL 2.25 mm, AR 0.91, DM 12 (all minute), DL 12:12, SQ 13:14, RR 0.30, VR 1.18, R/Cu 0.97; inner lobe of gonocoxite very broad and with rounded posterior margin (after Sasa et al., 1988) ***oyabebrevicosta*** **Sasa et al.**

- Ninth tergite with long setae in the middle portion, posterior margin not divided into two lobes; R/Cu about 1.0 **14**

14- Gonocoxite with two inner lobes, a broad and rectangular apical lobe, and a small conical lobe near the base; gonostylus without a keel; tip of antenna swollen and with an apical process; larger midge with WL 1.80-1.90 mm; AR 0.75-0.87; eyes reniform and without dorsomedial projection, ER 1.41-1.54; DM 12-14, all minute; DL 8-11, SQ 12-15, fLR 0.63-0.67, fBR 2.8-3.0 (after Sasa, 1984) ***chuzeoctava*** **Sasa**

- Gonostylus with one broad inner lobe with rounded posterior margin; gonostylus with a keel along posterior margin; tip of antenna not swollen and without apical process; WL 1.30-1.50 mm, AR 0.45-0.69; eyes with a dorsomedial projection, ER 0.79-1.00; DM 4-6, all minute; DL 5-7, SQ 5-8, fLR 0.59-0.60 (after Sasa, 1984) ***chuzenona*** **Sasa**

3. Genus ***Heterotrissocladius*** Spärck, 1923

One species, ***subpilosus*** (Kieffer, 1911), was collected at Lake Akan and Toya (Hokkaido). WL 2.30-2.76, AR 1.66-2.02, ER 0.72-0.96, DM 0, DL 8-16, PA 6-8, SC 14-18, SQ 21-32, VR 1.12, fLR 0.80-0.89, fBR 2.1-3.1 (after Sasa & Kamimura, 1987)

4. Genus ***Orthocladius*** van der Wulp, 1873

Note: The species belonging to the genus *Orthocladius* are sometimes difficult

to be separated by adult males, as seen in the following keys, while their pupae often show important key characters for the identification of subgenus and species. Therefore, a key to known pupae of Japanese *Orthocladius* is attached.

1 - Anal point parallel-sided and rounded apically; scutellum with 16 or more setae distributed irregularly (in the pupa, anal lobe without macrosetae and with 1-4 medial setae; thoracic horn either absent, or smooth ovoid to elongate oval) **Subgenus *Euorthocladius* Thienemann**

- Anal point tapered to a pointed apex; scutellum usually with 8-14 setae situated on a transverse line, rarely more numerous and distributed irregularly (in the pupa, anal lobe bears three macrosetae; thoracic horn long, tube-like, and with a few to numerous spinules on the surface) **Subgenus *Orthocladius*, s. str.**

(1) Subgenus ***Euorthocladius*** Thienemann, 1935

1 - Scutum without dorsomedian setae; gonostyulus with a broad swelling on inner margin; inner lobe of gonocoxite broad and roughly rectangular; body largely dark brown; WL 2.37-2.65 mm, AR 1.47-1.93, ER 1.06-1.36, DL 9-12, SC 16-28,fLR 0.77-0.79, fBR 2.4-4.1 (measurement by Sasa with specimens collected in winter in Toyama; pupa with thoracic horn roughly oval on a stalk, like in *saxosus*, but has two setae on anal fins, which are absent in *saxosus*) ***kanii* (Tokunaga)**

- Scutum with 12-20 dorsomedian setae; gonostylus without broad swelling on inner margin; inner lobe of gonocoxite longer than wide and tapering towards rounded apex; body also dark brown; WL 2.35-2.62 mm, AR 1.63-1.72, ER 0.86-0.88 (smaller), DL 21-26 (larger), SC 18-30, fLR 0.79, fBR 3.7 (after Sasa & Kamimura, 1987; Sasa, 1988a) ***frigidus* (Zetterstedt)**

Note: In addition, ***Spaniotoma (Orthocladius) saxosa*** Tokunaga, 1939, was described with male, female, pupa and larva from a rapid stream at Kibune (Kyoto). In male, BL 3.5 mm, body almost entirely black, eyes bare, AR 1.3, Tarsi I and II of middle and hind legs with apical spurs, anal point setigerous, gonocoxite with a small inner lobe, and gonostylus with a prominent triangular subapical tooth. Thoracic horns of pupa are small, bare sphere on a stalk, and thus this species seems to belong to Type 1 of *Euorthocladius* of Soponis (1977, p.16). A male was also described by Sasa & Kamimura (1987, p.27) from Lake Akan (Ho-kkaido) by the name of ***Orthocladius (Euorthocladius)* sp. near *saxosus*.**

(2) Subgenus ***Orthocladius,*** s. str. (a provisional key)

1 - Wing membrane bluish when examined by transmitted light **2**

- Wing membrane brownish when examined by transmitted light **3**

2 - AR 1.64-1.87; anal lobe slightly produced inwards; costa slightly extending beyond tip of R4+5; WL 2.50-2.92 mm, SC 10-14 (most frequently 12); in

the pupa, thoracic horns are largely smooth and with only a few spinules in the distal part, anal fins without spines at the base of terminal bristles; collected from an oligotrophic lake (after Sasa, 1984)

chuzesextus **Sasa**

- AR 2.21-2.62; anal lobe not produced inwards; costa not produced beyond tip of R4+5; WL 2.60-2.76 mm, SC 8-14; in the pupa, thoracic horns bear numerous spinules on entire surface, anal fins with several strong spines at the base of terminal bristles; collected from a polluted stream (after Sasa, 1979) ***yugashimaensis*** **Sasa**

3 - Anal lobe of wing strongly produced inwards **4**

- Anal lobe of wing not or only slightly produced inwards, namely almost rectangular **6**

4 - Large midge with WL 4.0-4.2 mm, AR 2.83-2.86, and with long tarsal beards (after Tokunaga, 1964, Edwards, 1929)

glabripennis **(Goetghebuer)**

- WL less than 4.0 mm, tarsi without long beards **5**

5 - Scutellar setae 16-29, distributed irregularly on scutellum; WL 1.90-2.45 mm, AR 1.76-2.36 in the small form, WL 2.66-3.33 mm, AR 2.57-3.00 in the large form; in the pupa, thoracic horns are tube-like, apically pointed and with numerous spinules on the surface; anal fins with spines at the base of terminal bristles; collected from bottom of mountain lakes (after Sasa, 1984) ***chuzeseptimus*** **Sasa**

- Scutellar setae 8-14, distributed in a transverse line on scutellum; WL 2.29-2.92 mm, AR 1.46-1.71; in the pupa, thoracic horns are tube-like and with only a few spinules; anal fins without spines at the base of terminal bristles; collected from clean mountain streams (after Sasa, 1979)

makabensis **Sasa**

6 - Body yellow, with reddish-brown stripes; gonostylus slender, without sub-apical tooth, and curved inwards at about middle; AR 1.12-1.49, WL 1.40-1.45 mm, DM 12-18, , DL 11-13, SC 7-9, fLR 0.69-0.75, fBR 1.5-2.0; in the pupa, thoracic horn is tube-like and with only a few spinules, abdominal tergite II largely free from spines, anal fins with a few spines at the base of terminal bristles; collected from rather polluted sites of River Tama (after Sasa, 1981) ***tamarutilus*** **Sasa**

- Body dark brown or brown; AR larger than 1.5, WL larger than 1.7 mm **7**

7 - Gonostylus slender, almost parallel-sided and abruptly curved inwards near apex; WL 1.90-2.21 mm, AR 1.46-1.86, SC 6-11; in the pupa, thoracic horns are tube-like and with numerous spinules on entire surface, tergite II largely free from spines, and anal fins without spines at the base of terminal bristles; collected from unpolluted upstream parts of River Tama (after Sasa, 1981) ***tamanitidus*** **Sasa**

- Gonostylus stout, widest at about middle, both inner and outer margin convex; WL 1.72-2.34 mm, AR 1.56-1.78, SC 8-10, all within the range of variation same as above; in the pupa, thoracic horns are tapering towards pointed apex and with numerous spinules, tergite II largely covered with spinose area, and anal fins with a few spines at the base of terminal bristles;

collected from highly polluted sites of River Tama (after Sasa, 1981)
tamaputridus Sasa

Note 1: ***Spaniotoma suspensus*** **Tokunaga, 1939** was described by male, female, pupa and larva collected from a mountain stream at Kibune (Kyoto). This species could clearly be differentiated in pupa from the allied ones by the structure of thoracic horn, abdominal tergites and anal lobes. In the male, however, it seems to be closest to *chuzeseptimus* in the above key, but cannot be differentiated from it so long as Tokunaga's original descriptions concern.

Note 2: ***Spaniotoma (Orthocladius) filamentosa*** **Tokunaga, 1939** was described also by male, female, pupa and larva collected from a mountain stream at Kibune (Kyoto), and is characterized by long and filamentous thoracic respiratory organs of pupa, but because Tokunaga's original description of the male is very brief, I cannot give a key to differentiate it from the allied species.

Key to pupae of some Japanese ORTHOCLADIINI

(including genera ***Orthocladius, Eukiefferiella***, and some related genera)
Abbreviation: **TRO**: thoracic respiratory organ, or thoracic horn

1 - TRO absent **2**
- TRO present **3**

2 - Anal fins without terminal bristles (after Tokunaga, 1939)
Rheocricotopus intermedius **(Tokunaga)**
- Anal fins with three terminal bristles (after Tokunaga, 1939)
Tokunagaia kibunensis **(Tokunaga)**

3 - TRO small and spherical; anal fins without terminal bristles **4**
- TRO long and slender, either tube-like or filamentous; anal fins each with three terminal bristles (except in *suspensus* Tokunaga) **5**

4 - Abdominal tergites II and III without spinose areas; anal segment with two pairs of simple lateral setae (after Tokunaga, 1939)
Orthocladius (Euorthocladius) kanii **(Tokunaga)**
- Abdominal tergites II and III with conspicuous spinose areas, and with a caudal band of strong recurved spines; anal segment without lateral setae (after Tokunaga, 1939)
Orthocladius (Euorthocladius) saxosus **(Tokunaga)**

5 - TRO very long, narrow and filamentous **6**
- TRO shorter and rigid tubes, nearly equal in diameter towards tip and apically rounded, or tapering towards pointed tip **9**

6 - TRO expanded basally and gradually tapering towards apex into a filament
Genus ***Eukiefferiella*** (in part) **7**
- TRO filamentous from base to tip; abdominal tergites VI to VIII without caudal band of spines (after Tokunaga, 1939)
Orthocladius(?) filamentosus **(Tokunaga)**

7 - Basal bulbous part of TRO nearly globular and abruptly constricted into the distal filamentous part; tergite II without caudal band of large recurved spines; first lateral seta on tergites II to VII much longer than the other

lateral setae; anal fins with a long inner seta (after Sasa, 1981)
Rheocricotopus tamahumeralis **Sasa**

- Basal bulbous part of TRO longer than wide and gradually tapered into the distal filamentous part; tergites II with a caudal band of large recurved setae, as usual; lateral setae on tergites II to VII all short and simple; anal fins without inner seta 8

8 - Basal bulbous part of TRO about 1/4 of its length (after Sasa, 1979)
Eukiefferiella yasunoi **Sasa**

- Basal bulbous part of TRO about half of its length (after Tokunaga, 1939)
Eukiefferiella tentoriola **(Tokunaga)**

9 - TRO tubes smooth and apically rounded; abdominal tergites with 2 or 3 with dark spinose patches characteristic to this species; genital sheaths in male extending far beyond anal lobes (after Tokunaga, 1939)
Orthocladius (Orthocladius) suspensus **(Tokunaga)**

- TRO tubes with spinules on the surface, and apically pointed; with a pair of anal fins bearing three terminal bristles **10**

10- Anal fins without spines at the base of terminal bristles **11**

- Anal fins with spines at the base of terminal bristles **13**

11- Tergite II largely bare, with a pair of small spinose areas near caudal margin, and a small spinose area in the middle composed of 32-56 small recurved spines; sternites IV to VIII each with a pair of caudolateral spinose areas; TRO tubes with numerous spinules along entire length (after Sasa, 1981)
Orthocladius (Orthocladius) tamanitidus **Sasa**

- Tergite II with broad spinose areas in the middle, and a caudal band of large recurved spines arranged roughly in double rows; caudolateral spinose areasare present on sternites IV to VI, but absent on other sternites; TRO tubes with much fewer spinules restricted to the apical portion **12**

12- Spinose areas a and b are absent on tergite II, only c and d present (after Sasa, 1984) ***Orthocladius (Orthocladius) chuzesextus*** **Sasa**

- Spinose areas a, b, c and d present on tergite II, covering almost entire surface of the segment (after Sasa, 1979)
Orthocladius (Orthocladius) makabensis **Sasa**

13- TRO tubes with only a few spinules; tergite II without spinose area on oral half (II-a, -b, absent; after Sasa, 1981)
Orthocladius (Orthocladius) tamarutilus **Sasa**

- TRO tubes thickly covered with spinules on entire surface; tergite II almost entirely covered by spinose areas (II-a, b, c, d present) **14**

14- Lateral hairs on abdominal segment VII 5 pairs (after Sasa, 1984)
Orthocladius (Orthocladius) chuzeseptimus **Sasa**

- Lateral hairs on abdominal segment VII 4 pairs **15**

15- Tergite II with 28-43 recurved spines along caudal margin; TRO tube 254-311 microns long; spinose areas on tergites II to IV small and not corvering the entire surface (after Sasa, 1981)
Orthocladius (Orthocladius) tamaputridus **Sasa**

- Tergite II with 46-86 recurved spines along caudal margin; TRO tube 352-435 microns long; tergites II to IV almost entirely covered by spinose areas

(after Sasa, 1979)
Orthocladius (Orthocladius) yugashimaensis Sasa

5. Genus ***Psectrocladius*** Kieffer, 1906

1 - Middle tibia with two well developed terminal spurs (subgenus *Monopsectrocladius*); body largely whitish yellow, scutal stripes black; gonocoxite without inner lobe; BL 2.4-2.8 mm, AR 0.38-0.39; found on gravelly seashore (after Tokunaga, 1936) ***yukawana* (Tokunaga)**
- Middle tibia with a single apical spur (subgenus *Psectrocladius*, s. str.); body dark brown to black; gonocoxite with a broad inner lobe **2**

2 - Body largely brown; anal point and gonostylus broader; terminal spur of gonostylus paler; WL 2.29-3.23 mm, AR 1.70-2.08, fLR 0.77, fBR 2.1 (after Sasa, 1979) ***aquatronus* Sasa**
- Body largely dark brown; anal point and gonostylus narrower; terminal spur ofgonostylus dark; WL 2.49-2.91 mm, AR 1.78-2.04, fLR 0.70-0/75, fBR 2.2-3.2) ***yunoquartus* Sasa**

Note: The above two species were differentiated also in female by the shape of cercus, and in pupa by the distribution of spines and lateral hairs on abdominal segments, and in larva by the structure of labial plate, by Sasa (1984, p.72).

6. Genus ***Synorthocladius*** Thienemann, 1935

One species, ***tamaparvulus* Sasa, 1981** was recorded from River Tama. Body coloration black marks on yellow ground color; WL 1.08-1.24 mm, AR 0.60-0.68, ER 1.30, DM 0, DL 5-6, PA 2-4, SC 4, SQ 4, fLR 0.58-0.63, fBR 3.0; Cu2 straight, pulvilli absent; anal point triangular, gonocoxite with double inner lobes.

7. Genus ***Tokunagaia*** Saether, 1973

One species, ***kibunensis* (Tokunaga, 1939)** was recorded by male, female, pupa and larva collected from a stream at Kibune (Kyoto). BL 3.7 mm, AR 1.12, body almost entirely black; eyes bare, with strong dorsomedial projection; all tibiae with only one terminal spur, tarsi I and II of middle and hind legs with a terminal spur: pulvilli absent, squama fringed; anal point absent, ninth tergite with two setigerous hemispheres (after Tokunaga, 1939; Saether, 1969, 1973; Halvorsen et Saether, 1987).

BB. Tribe METRIOCNEMINI

1. Genus ***Chaetocladius*** Kieffer, 1911

One species, ***oyabevenustus* Sasa et al., 1988,** was recorded from River Oyabe (Toyama). Body dark brown, scutum and postnotum black; WL 2.88mm, ER 0.77, AR 2.27, DM 16 (all minute), DL 10, PA 5, SC 8; wing granular, SQ 12, 13, RR o.49, VR 1.00, R/Cu 1.11; fLR 0.69, fBR 2.6; small pulvilli present; anal point long, inner lobe of gonocoxite large and quadrangular.

2. Genus *Heleniella* Gowin, 1943

One species, ***osarumaculata*** **Sasa, 1988** was recorded from Hokkaido. Body dark brown, stripes black; eyes pubescent, wing with two large dark marks, Cu2 strongly curved, R2+3 almost in contact with R4+5; WL 1.41-1.51, ER 1.04-1.08, AR 0.81, DL 64-80, PA 20-23, SC 28-32, SQ 0, VR 1.14-1.16, R/Cu 1.01, fLR 0.57-0.60, fBR 2.7-2.9.

3. Genus *Limnophyes* Eaton, 1875

1 - Gonostylus without subapical spine, widest at about middle and tapering towards pointed apex **2**
 - Gonostylus with a subapical spine (crista dorsalis) **5**

2 - Antenna with 13 flagellar segments, AR larger than 0.6; scutum with lamellar setae in prescutellar area **3**
 - Antenna with 12 flagellar segments, AR 0.22-0.30; scutum with lamellar setae in humeral area but not in prescutellar area; WL 0.90-0.92 mm, DL 54-58 (after Sasa, 1983) ***tamakireides*** **Sasa**

3 - Scutum without lamellar setae in humeral area **4**
 - Scutum with lamellar setae both in humeral and prescutellar areas, those in prescutellar area 43-51 microns long; WL 1.34-1.38 mm, AR 0.77-0.82, DL 38-42 (after Sasa, 1985a) ***prolongatus*** **Kieffer**

4 - Inner lobe of gonocoxite very broad and wide; lamellar setae in prescutellar area 34-37 microns long; WL 0.98-1.09 mm, AR 0.68-0.86, DL 18-23 (after Sasa et al., 1988) ***oyabegrandilobus*** **Sasa et al.**
 - Inner lobe of gonocoxite small and longer than wide; gonostylus with rounded apical process and three strong subapical setae; lamellar setae in prescutellar area 38-40 microns long; WL 1.82 mm, AR 0.71, DL 28 (after Sasa et al., 1988) ***oyabehiematus*** **Sasa et al.**

5 - Dorsolateral setae of scutum usually 8-12, all simple **6**
 - Dorsolateral setae of scutum usually 18 or more (sometimes more than 50), and with lamellar setae in humeral and/or prescutellar areas **10**

6 - Antenna with 13 flagellar segments, AR 0.87; with a small conical anal point bearing numerous short setae; WL 1.28 mm, DM 8, DL 12-13, fLR 0.53, fBR 2.0 (after Sasa & Kamimura, 1987) ***akanundecimus*** **Sasa et Kamimura**
 - Antenna with 12 or less flagellar segments **7**

7 - Anal point present, small, conical and pubescent **8**
 - Anal point absent; inner lobe of gonocoxite with rounded margin; gonostylus without angulate subapical tooth **9**

8 - Inner lobe of gonocoxite broad and with angulate margin; gonostylus truncate apically, and with an angulate subapical tooth; WL 0.90-0.97 mm, AR 0.36-0.64, DM 0, DL 8-10, fLR 0.46-0.51, fBR 2.1-2.4 (after Sasa, 1985c) ***fujinonus*** **Sasa**
 - Inner lobe of gonocoxite small and blunt; gonostylus pointed apically, and without subapical tooth; BL 1.5 mm, AR only 0.14 (after Tokunaga, 1940) ***fuscipygmus*** **(Tokunaga)**

9 - Antenna with 10 flagellar segments, AR 0.37; inner lobe of gonocoxite single, broad and with rounded margin; gonostylus almost straight, slightly expanded near apex; WL 0.84 mm, DM 0, DL 13, fLR 0.49, fBR 1.9 (after Sasa, 1983) ***tamakiyoides* Sasa**

- Antenna with 11 or 12 flagellar segments, AR 0.64-0.80; inner lobe of gonocoxite double, the dorsal lobe somewhat finger-like, the ventral lobe broad and low; WL 0.95-1.05 mm, DM 0-5, DL 10-12, fLR 4.9-5.2, fBR 1.4-2.2 (after Sasa & Kikuchi, 1986) ***hudsoni* Saether**

10- Gonostylus with convex inner margin, widest at about basal 1/3 and tapering towards pointed apex, with a long and stout subapical spine; antenna with 13 flagellar segments, AR 0.85-0.90; inner lobe of gonocoxite double, the dorsal lobe finger-like, the ventral lobe broad and low (after Sasa & Kamimura) ***akannonus* Sasa et Kamimura**

- Gonostylus apically rounded or truncate, subapical spine much shorter **9**

11- Antenna with 13 flagellar segments, AR 1.50-1.55; gonostylus flat and broad, somewhat egg-shaped when seen from above; anal point low and broad; inner lobe of gonocoxite low and flat, with short and stout setae; antepronotum without dorsal setae and with some 20 lateral setae; WL 1.44-1.97 mm, DM 20, DL 18-26 (after Sasa, 1985c) ***fujidecimus* Sasa**

- Antenna with 11-13 flagellar segments, AR 0.8 or less; gonostylus slender and nearly parallel-sided; anal point absent; inner lobe of gonocoxite without such stout setae; DM 10 or less; antepronotum with dorsal setae, and 1-4 lateral setae **12**

12- Antenna with 13 flagellar segments, AR 0.89-1.12; scutum with some 20 lamellar setae in prescutellar area, but humeral area without lamellar setae; inner lobe of gonocoxite broad and rounded; WL 1.38-1.79 mm, DM 5-8, DL 15-32, fLR 0.53-0.56, fBR 2.1-3.0 (after Sasa, 1981) ***tamakitanaides* Sasa**

- Antenna with 11 or 12 flagellar segments, AR 0.50-0.63; scutum with 3-5 short lamellar setae in humeral area and 4-6 short lamellar setae in prescutellar area; inner lobe of gonocoxite almost rectangular; WL 1.17-1.28 mm, DM 4-5, DL 4-6 lanceolate prescutellar and 13-22 long simple setae; fLR 0.49-0.53, fBR 2.0-2.7 (after Sasa & Kamimura, 1987) ***akanangularius* Sasa et Kamimura**

4. Genus ***Metriocnemus*** van der Wulp, 1874

1 - Gonocoxite without inner lobe; AR 2.5-3.0; body almost entirely black; anal point small (after Tokunaga, 1940) ***picipes* (Meigen)**

- Gonocoxite with a conspicuous inner lobe; AR smaller than 1.8 **2**

2 - Body largely yellow, with brown marks; SC 10 in a transverse row; tarsi without terminal spurs; WL 1.44 mm, AR 0.94, DM 20, DL 27, PA 8-11, fLR 0.80, mLR 0.56, hLR 0.70, fBR 3.9 (after Sasa & Hasegawa, 1988) ***ryutanus* Sasa et Hasegawa**

- Body largely black; SC more than 20 in multiple rows; middle and hind tarsi I

and *II with two terminal spurs* 3

3 - AR 1.67-1.68; inner lobe of gonocoxite with angulate posterior margin; gonostylus without subapical tooth; WL 2.60-2.88 mm, DM 22-28, DL 30-37, PA 16-18, SC 28-39 (after Sasa et al., 1988) ***hygropetricus* Kieffer**

- AR 1.09-1.16, inner lobe of gonocoxite very broad, and with rounded posterior margin; gonostylus with a rectangular subapical tooth; WL 1.65-1.68, DM 25-28, DL 56-76, PA 18-31, SC 26-38 (after Sasa, 1983, 1988) ***tamaokui* Sasa**

5. Genus *Okayamayusurika* Sasa, gen. nov.

One species, ***kojimaspinosa*, sp. nov.** was collected, and described in Part 3 of this paper.

6. Genus *Okinawayusurika* Sasa et Hasegawa, 1988

One species, ***otsurui* Sasa et Hasegawa, 1988,** was recorded from Ikema Island (Okinawa). This genus is characterised in having a terminal comb composed of free spurs not only on hind tibia (as usual for Orthocladiinae), but also on middle tibia (not seen in other genera of this subfamily). Wing membrane granular as in *Limnophyes*, both anal point and inner lobe of gonocoxite absent. Body with dark brown marks on yellow ground color. WL 1.52 mm, ER 0.80, AR 1.31, DM 22 (minute), DL 18, PA 6, 7, SC 7, SQ 3, RR 0.36, VR 1.22, fLR 0.61; Cu2 straight, pulvilli absent.

7. Genus *Parachaetocladius* Wuelker, 1959

One species, ***akanoctavus* Sasa et Kamimura, 1987,** was recorded from Hokkaido. Body black. WL 2.22-2.73 mm, ER 1.38-1.52, AR 1.50-1.72, DM 0, DL 20-33, PA 10-12, SC 18-36, SQ 17-32, fBR 2.3-3.3; eyes bare, Cu2 almost straight, pulvilli large; anal point wide, low and crescent shaped, bearing strong setae; inner lobes of gonocoxite long, narrow and rod-like; gonostylus with a conspicuous subapical process on outer margin.

8. Genus *Parakiefferiella* Thienemann, 1936

1 - Gonostylus tapering towards sharply pointed apex; inner lobe of gonocoxite very broad and with rounded posterior margin; Cu2 almost straight; abdominal tergites each with a narrow dark band along caudal margin; BL 3.0 mm, AR 1.0 (after Tokunaga, 1940) ***tipuliformis* (Tokunaga)**

- Gonostylus truncate or rounded apically; inner lobe of gonocoxite shorter; Cu2 strongly curved at middle; abdominal tergites almost uniform in color, without dark band; BL 2.2 mm or less, WL 1.5 mm or less, AR less than 0.85 2

2 - R2+3 ending about midway between tips of R1 and R4+5, or closer to the

former (RR 0.5 or less) **3**

- R2+3 almost fused with R4+5, or ending very close to its tip **4**

3 - Gonostylus apically expanded and abruptly curved inwards; VR and R/Cu both about 1.0; body largely brown, with dark brown marks; WL 1.34-1.43 mm, AR 0.67-0.69, DM 0, DL 4-6, PA 3, SC only 2; anal point small and triangular, and without lateral setae; ninth tergite with 8 long setae at the base of anal point; inner lobe of gonocoxite large, wide and rounded (after Sasa, 1984) ***chuzeundecima* (Sasa)**

- Gonostylus not expanded and not curved apically; VR 1.42, R/Cu 0.98; WL 0.95 mm, AR 0.40, DM 8 (all minute), DL 6, PA 2, SC 2; anal point composed of a large, broad triangular base bearing lateral setae, and a small, hyaline apical process with rounded apex; ninth tergite without long setae; inner lobe of gonocoxite quadrangular (after Sasa et al., 1988) ***oyabelurida* Sasa et al.**

4 - Body entirely pale yellow; AR 0.23-0.26; R2+3 completely fused with R4+5; R/Cu 0.91-0.93, WL 0.79-1.02 mm, DM 0, DL 4-6, PA 3, SC 2 or 4, fLR 0.44-0.50; anal point semicircular: inner lobe of gonocoxite broad and rounded (after Sasa, 1988a) ***osaruflava* Sasa**

- Body largely brown or dark brown; AR 0.36 or larger; R2+3 separated from R4+5; R/Cu 1.0 or larger **5**

5 - Anal point longer than wide, and almost parallel-sided; fLR 0.40-0.43 (unusually small); body with dark brown marks on yellow ground color; AR 0.36-0.37, R/Cu 1.04; gonostylus pointed apically (after Sasa, 1988a) ***osarufusca* Sasa**

- Anal point wider than long, rectangular or semicircular; fLR larger than 0.5 **6**

6 - Anal point semicircular; inner lobe of gonocoxite double; WL 1.31-1.38 mm, AR 0.44-0.45, VR 1.30-1.35; gonostylus straight and swollen diatally (after Sasa & Kawai, 1987b) ***itachiquarta* Sasa et Kawai**

- Anal point triangular; inner lobe of gonocoxite single **7**

7 - Ground color of scutum yellow, stripes reddish brown, abdominal tergites brown; WL 1.05-1.18 mm, AR 0.38-0.48, inner lobe of gonocoxite broad and rectangular (after Sasa, 1981) ***tamatriangulata* Sasa**

- Ground color of scutum brown, stripes and postnotum black, abdominal tergites yellow; WL 1.38-1.48 mm, AR 0.71-0.85; inner lobe of gonocoxite broad and rounded (after Sasa, 1985) ***bathophila* (Kieffer)**

9. Genus ***Parametriocnemus*** Goetghebuer, 1923

1 - Large midge with WL 2.60-2.73 mm; AR large, 1.63-1.83; macrotrichiae on wing fewer, restricted to distal part; costa not extending beyond tip of R4+5; anal point triangular and with stronger setae; inner lobe of gonocoxite rounded (after Sasa, 1984) ***chuzedecimus* Sasa**

- Small midge with WL 1.34-1.42 mm; AR small, 0.79-0.95; macrotrichiae on wing distributed more extensively, also on proximal half; costa extending much beyond tip of R4+5; anal point slender and apically rounded and with shorter setae; inner lobe of gonocoxite rectangular (after Sasa, 1981) ***stylatus* (Kieffer)**

10. Genus ***Paraphaenocladius*** Sparck et Thienemann, 1926

One species, ***penerasus* (Edwards)**, was recorded by Sasa (1988a) from Lake Toya (Hokkaido). Body yellow, with brown marks; WL 1.04 mm, ER 0.89, AR 0.27, DM 10 (minute), DL 12, 13, PA 5, 6, SC 6, SQ 2, fLR 0.63, fBR 1.5; eyes bare, wing with macrotrichiae, costa extending much beyond tip of R4+5, Cu2 slightly curved; anal point long and robust, basal 2/3 covered with microtrichiae; inner lobe of gonocoxite small and triangular; gonostylus with an angulate subapical tooth.

11. Genus ***Pseudorthocladius*** Goetghebuer, 1932

1 - Inner lobe of gonocoxite low, much wider than long; inner margin of gonostylus strongly expended in the middle **2**

- Inner lobe of gonocoxite longer than wide; inner margin of gonostylus not expanded in the middle 4

2 - Ninth tergite without distinct anal point, but with a large, wide and rounded lobe with chitinized posterior margin bearing strong setae; WL 1.83 mm, AR 1.09, DM 12 (all minute), DL 30:30, SC 18 in double rows, RR 0.56, VR 1.17 (after Sasa & Kawai, 1987b) ***matusecundus* Sasa et Kawai**

- Ninth tergite with a distinct anal point 3

3 - Anal point robust, 110 microns wide and 75 microns high; WL 1.83-1.86 mm, AR 1.11-1.13; gonostylus expanded at about middle (after Sasa & Kamimura, 1987) ***akanseptimus* Sasa et Kamimura**

- Anal point much smaller, 22 microns wide and 20 microns high; WL 1.04-1.12 mm, AR 0.43-0.50; gonostylus expanded at about distal 1/3 (after Sasa et al, 1988) ***oyabecrassus* Sasa et al.**

4 - Inner lobe of gonocoxite expanded and hooked apically; gonostylus expanded laterally in the middle; WL 1.38-1.62 mm, AR 0.89-0.98 (after Sasa, 1985) ***fujiseptimus* Sasa**

- Inner lobe of gonocoxite thumb-like and not expanded apically; gonostylus narrower and not expanded medially; WL 1.48-1.62 mm, AR 0.81-0.92 (after Sasa, 1985) ***fujioctavus* Sasa**

12. Genus ***Pseudosmittia*** Goetghebuer, 1932

1 - Gonocoxite with three inner lobes, the middle one much longer than wide and apically pointed; anal point long, narrow, parallel-sided and apically rounded; body entirely black; WL 1.14-1.28 mm, AR 1.00-1.14, RR 0.72-0.92, VR 1.42-1.57, R/Cu 0.86-0.93, fLR 0.41-0.44, fBR 3.0-3.9 (after Sasa, 1985) ***triappendiculata* (Goetghebuer)**

- Gonocoxite with one or two inner lobes **2**

2 - Gonostylus forked into two lobes apically; anal point broad and rounded; inner lobe of gonocoxite acutely angular; WL 1.66 mm, AR 0.78, VR 1.35, fLR 0.38, fBR 3.0 (after Sasa & Kawai, 1987) ***itachibifurca* Sasa et Kawai**

- Gonostylus simple **3**

3 - Anal point absent; gonocoxite with two broad inner lobes, the dorsal lobe roughly rectangular, the ventral one low and broad; gonostylus widest near apex, and apically truncate; antepronotum united in the middle; costa not extending beyond end of R4+5; WL 2.07-2.48 mm, AR 2.07-2.21, RR 0.42-0.47, VR 1.21-1.26, R/Cu about 1.0, fLR 0.43-0.45, fBR 2.8-3.1 (after Sasa & Kawai) ***itachisecunda* Sasa et Kawai**

- Anal point present **4**

4 - Anal point long, narrow, almost parallel-sided and apically rounded **5**

- Anal point widest at base and nearly triangular **6**

5 - Inner lobe of gonocoxite single, roughly rectangular; WL 1.08-1.22 mm, AR 1.19-1.37, VR 1.66-1.83, R/Cu 0.90-0.94, fLR 0.54-0.58, fBR 4.0-5.1: collected from an eutrophicated pond in Okinawa, southern Japan (after Sasa & Hasegawa, 1988) ***ikemaensis* Sasa et Hasegawa**

- Inner lobe of gonocoxite double, the dorsal lobe longer than wide and finger-like, the vantral lobe low and bearing numerous short setae; WL 1.47 mm, AR 1.49, VR 1.37, R/Cu 0.96, fLR 0.42, fBR 3.0; collected from Lake Toya, northern Japan (after Sasa, 1988a) ***toyanigra* Sasa**

6 - Vein Cu2 forked like figure Y; inner lobe of gonocoxite extremely long, slender and finger-like; WL 1.06 mm, AR 0.7; collected on seashore (after Tokunaga, 1936) ***bifurcata* (Tokunaga)**

- Vein Cu2 simple as usual; inner lobe of gonocoxite lower and broader **7**

7 - Anal point triangular and pointed apically; inner lobe of gonocoxite about as long as wide and rounded; WL 0.94-1.14 mm, AR 0.82-0.94, ER 1.37-1.67, VR 1.50-1.71, R/Cu 0.83-0.92, fLR 0.48-0.51, fBR 2.4-2.8 (after Sasa & Hasegawa, 1988) ***nishiharaensis* Sasa et Hasegawa**

- Anal point rounded apically; inner lobe of gonocoxite acutely angular; WL 1.08 mm, ER 1.62, DL 10, PA 3, SC 4, RR 0.73, VR 1.33, R/Cu 0.91 (after Sasa. Part 3 of this paper) **sp. kojimatertia**

13. Genus *Smittia* Holmgren, 1869

1 - Eyes bare **1**

- Eyes pubescent **6**

2 - Anal point either absent, or long, needle-like and situated on a U-shaped basein the center of ninth tergite **3**

- Anal point large, triangular and extending much beyond posterior margin of ninth tergite; gonostylus tapering towards pointed apex; WL 1.0 mm, AR 0.5-0.8; costa not extending beyond tip of R4+5; antenna with a terminal seta; collected on a gravelly seashore (after Tokunaga, 1936c) ***littoralis* Tokunaga**

3 - Anal point absent, ninth tergite with short stiff setae on caudal margin; inner lobe of gonocoxite very large, blunt and setigerous; antenna with 13 flagellar segments, AR 0.73, last segment with two apical setae; Cu2 nearly straight; collected on a high mountain in Taiwan (after Tokunaga, 1939) ***truncatocauda* Tokunaga**

- Anal point long and needle-like; ninth tergite with setae at the base of anal point

but not on the posterior margin; inner lobe of gonocoxite smaller **4**

4 - Anal point short, microtrichiae extending almost to apex; gonostylus widest at apex and not expanded in the middle; AR 0.8 or smaller, DM 0 **5**

- Anal point longer, distal half without microtrichiae; inner margin of gonostylus widely expanded in the middle; AR 1.41-1.54, WL 1.25-1.58, DM 6-10, fLR 0.53-0.55, fBR 2.8-4.4 (after Sasa & Hasegawa, 1988) ***pratora* (Goetghebuer)**

5 - AR 0.29; inner lobe of gonocoxite double, the basal one quadrangular and the distal one broad and rounded; costa extending much beyond tip of R4+5; bases of setae on ninth tergite small, as usual; WL 1.42 mm, SC 4, RR 0.36, VR 1.38, R/Cu 1.04, fLR 0.42 (after Sasa & Kawai, 1987b) ***itachinudiocula* Sasa et Kawai**

- AR 0.69-0.78; inner lobe of gonocoxite single, small and rounded; costa not extending beyond tip of R4+5; ninth tergite with about 12 setae on both sides of anal point, among which the distal group arise from conspicuous tubercles; WL 1.60 mm, SC 6, RR 0.29, VR 1.32, R/Cu 0.98, fLR 0.47-0.49 (after Sasa & Kawai, 1987b) ***itachituberculata* Sasa et Kawai**

6 - Antenna with 12 or less flagellar segments, AR 0.4 or less; marine or seashore species **7**

- Antenna with 13 flagellar segments, AR larger than 1.0; anal point long and narrow; terrestrial or freshwater species **8**

7 - Antenna with only 8 flagellar segments, AR 0.4, antennal hairs poorly developed; anal point large, conical and pubescent; gonostylus long and tapering towards pointed apex (after Tokunaga, 1936c) ***nemalionis* Tokunaga**

- Antenna with 12 flagellar segments, AR 0.2, antennal hairs well developed; anal point absent; gonostylus widest at about middle (after Tokunaga, 1936c) ***endocladiae* Tokunaga**

8 - Anal point long, and without microtrichiae except for the basal portion **9**

- Anal point shorter, covered with microtrichiae to near the tip **12**

9 - Gonostylus with a sharply pointed apical process extending along its axis, and a narrow, angulate subapical tooth; AR 1.89-2.38; scutum and scutellum withnumerous setae, DM 6-12, DL 17-39, PA 6-12, SC 16-26 (after Sasa, 1984) ***sainokoensis* Sasa**

- Gonostylus without apical process, and with a rounded subapical swelling on inner margin; scutum and scutellum with smaller numbers of setae **10**

10- Subapical swelling on inner margin of gonostylus wide, extending more than half the length of gonostylus; inner lobe of gonostylus small and situated in the distal half **11**

- Subapical swelling on inner margin of gonostylus much shorter and semi-globular; inner lobe of gonocoxite large, longer than wide and situated near base; WL 1.76 mm, AR 2.11, DM 6, DL 8:8, SC 12, fLR 0.55 ***kojimagrandis* Sasa, sp. nov.**

11- Inner lobe of gonocoxite large, roughly rectangular but with a keel along proximal margin ending in a small, produced tip; WL 1.38-1.52 mm, AR 1.31-1.51, fLR 0.51-0.54, fBR 3.0-5.2 (after Sasa & Kawai, 1987b)

***itachipennis* Sasa et Kawai**

- Inner lobe of gonocoxite small and rounded; WL 1.07-1.41 mm, ER 1.23-1.50, AR 1.03-1.30, DM 2-7 (minute), DL 10-17, PA 4-8, SC 8-10, SQ 0, fLR 0.45-0.54, fBR 2.7-3.6 (after Sasa, 1985c, p.122; see note)

***nudipennis* (Goetghebuer)**

12- Gonostylus with a sharp apical process which extends much beyond subapical spur; BL 2 mm, AR 2.1; collected on a high mountain in Taiwan (after Tokunaga, 1939) ***niitakana* Tokunaga**

- Gonostylus without such an apical process **13**

13- Inner margin of gonostylus concave and without subapical tooth; inner lobe of gonocoxite low, wide and rounded; WL 1.79 mm, AR 1.86, DM 12, DL 8: 9, PA 3:3, SC 8, RR 0.36, VR 1.34, R/Cu 1.00, fLR 0.54, fBR 3.3; collected from a ditch in Okinawa (after Sasa & Hasegawa, 1988)

***gusukuensis* Sasa et Hasegawa**

- Inner margin of gonostylus convex or with subapical tooth; inner lobe of gonocoxite small and semicircular **14**

14- Inner margin of gonostylus broadly expanded; DM 7-12,; anal lobe of wing conspicuously produced; costa only slightly produced beyond tip of R4+5; WL 1.59-1.83 mm, AR 1.64-1.97, fLR 0.55-0.59, fBR 3.0-5.2 (after Sasa, 1985c) ***aterrima* (Meigen)**

- Inner margin of gonostylus with a rectangular subapical tooth but without broad swelling; DM 0; anal lobe of wing flat; costa much extending beyond tip of R4+5, R/Cu 0.9; WL 1.44 mm, AR 1.14, fLR 0.51, fBR 3.4 (after Sasa & Kamimura, 1987) ***akanduodecima* Sasa et Kamimura**

Note 1: *Smittia nudipennis* (Goetghebuer, 1913) was recorded from Taiwan by Tokunaga (1939), and from various localities in Japan by Sasa (1985c, 1988a,b), Sasa & Kamimura (1987) and Sasa & Kawai (1987a), but these specimens seem to be somewhat different from the type specimens from Europe in that R4+5 ending above tip of Cul, and anal lobe of wing is rather produced.

Note 2: In addition, ***Smittia vesparum* Goetghebuer, 1921** was recorded by Tokunaga (1940) from Sakhalin by male and female, without giving detailed morphological accounts. The female seems to be characteristic in having leaflike setae on antenna.

14. Genus ***Toyamayusurika*** Sasa et Kawai, 1987

(Gonostylus with a long basolateral process and V-shaped; eyes bare, wing bluish and granular, squama fringed, costa extending beyond tip of R4+5, Cu2 almost straight, anal point small, conical and with short latera setae, pulvilli absent)

1 - Body yellow, with brown marks; gonostylus without subapical tooth; basolateral process of gonostylus with thickened ridge; middle and hind tarsi I and II without apical spur; antenna without apical seta; eyes with a conspicuous dorsomedial projection, ER 0.67; WL 1.47 mm, AR 1.02, SO 3, CL 5, DM 10, DL 14-17, PA 8, SC 4, VR 1.21, R/Cu 1.13, fLR 0.59, mLR 0.47, hLR 0.59 (after Sasa, 1984) ***fujiquinta* (Sasa)**

- Body black; gonostylus with a conspicuous subapical tooth; basolateral process of gonostylus without thickened ridge; middle and hind tarsi I and II each with two apical spurs; antenna with an apical seta; eyes without dorsomedial projection, ER 1.14-1.26; WL 1.54-1.57, AR 0.98-1.14, SO 6-10, CL 6-10, DM 16-18, DL 24-30, PA 8-11, SC 10-12, VR 1.13-1.17, R/Cu 1.04-1.06, fLR 0.50-0.55, mLR 0.40-0.42, hLR 0.59-0.66 (after Sasa & Kawai, 1987; Sasa, 1988a) ***shiotanii* Sasa et Kawai**

15. Genus ***Trissocladius*** Kieffer, 1908

One species, ***itachigranulatus* Sasa et Kawai, 1987,** was recorded from Toyama. WL 1.84-2.14 mm, ER 0.68-0.91, AR 1.35-1.49, DM 8-10 (minute), DL 15-28, PA 4-8, SC 8, SQ 5-8, RR 0.36-0.38, VR 1.10-1.13

16. Genus ***Tsudayusurika*** Sasa, 1985

(Eyes, wings and squama all bare; antenna without apical seta, AR larger than 1.2; wing membrane granular, vein Cu2 strongly curved, coxta extending beyond tip of R4+5, anal vein extending beyond fCu; anal point absent, gonostylus with a broad inner lobe; female antenna with 10 flagellar segments, cerci rhombic and directed backwards)

1 - AR about 2.44; anal lobe of wing prominent; scutum shining black, halteres white; costa a little produced beyond end of R4+5 (after Tokunaga, 1940) ***multiannulata* (Tokunaga)**
- AR 1.26-1.48; anal lobe of wing obtuse; scutum brown, stripes dark brown; costa much produced beyond end of R4+5; WL 2.22-2.59 mm, ER 0.77-1.07, DM 7-10 (all minute), DL 5-8, PA 4-6, SC 6-8, fLR 0.72-0.76 (after Sasa, 1985b) ***fudosecunda* Sasa**

BC. Tribe CORYNONEURINI

1 - Hind tibia strongly expanded apically; abdominal tergites II to VIII each with only one seta in the middle; eyes bare (8 spp.) ***Corynoneura* Winnertz** **P.134**
- Hind tibia not expanded apically (exception: rather conspicuously expanded in *oyabequarta*); abdominal tergites II to VIII each with 4-7 setae in a transverse row; eyes usually pubescent, rarely bare (8 spp.) ***Thienemanniella* Kieffer** **P.135**

1. Genus ***Corynoneura*** Winnertz, 1846

1 - Tip of antenna with a group of short sensory setae; gonocoxite with a distinct inner lobe **2**
- Tip of antenna without a group of short sensory setae; BL 0.9-1.4 mm, AR about

0.6; ninth tergite with a pair of small but distinct caudal setigerous tubercles; gonocoxite without inner lobe; gonostylus with a triangular subapical tooth (after Tokunaga, 1936) ***cuspis*** **Tokunaga**

2 - Wing clavus black; wing vein M sinuous at tip; abdominal tergite I to IV whitish; BL 0.8-1.2 mm, antenna with 11 flagellar segments, AR 0.28-0.4; inner lobe of gonocoxite large, broad and with angulate posterior margin; gonostylus curved and tapering apically, without subapical tooth (after Tokunaga, 1936) ***tenuistyla*** **Tokunaga**

- Wing clavus not black; wing vein M almost straight 3

3 - Distal half of last antennal segment without long vertical haire 4

- Last antennal segment with long vertical hairs from base to beyond middle 5

4 - Antenna with 9 or 10 flagellar segments, AR 0.23-0.35; median stripes of scutum fused in the middle; fLR 0.43 (after Tokunaga, 1936) ***celtica*** **Edwards**

- Antenna with 11 flagellar segments, AR about 0.2; ground of scutum yellow, median stripes brown and widely separated in the middle; lateral stripes black, abdominal tergites yellowish brown; fLR 0.53 (after Tokunaga, 1936) ***vittalis*** **Tokunaga**

5 - Antenna with 12 flagellar segments, AR 0.62-0.70; body almost entirely black; ninth tergite with a pair of conspicuous lobes on posterior margin; inner lobe of gonocoxite broad and rounded; gonostylus almost parallel-sided and apically rounded, without subapical tooth (after Sasa, 1985c) ***fujiundecima*** **Sasa**

- Antenna with 9-11 flagellar segments; gonostylus apically curved and tapering towards pointed apex 6

6 - AR about 0.89; apical pubescence of antenna extending over an area longer than diameter of the segment; WL about 1 mm, very long and narrow; inner lobe of gonocoxite small and quadrangular; gonostylus strongly curved and tapering towards pointed apex; body largely dark brown (after Tokunaga, 1936) ***longipennis*** **Tokunaga**

- AR smaller than 0.6; apical pubescence of antenna at extreme tip only; body largely black 7

7 - Inner lobe of gonocoxite small; WL 0.59-0.66 mm, AR 0.28-0.43, fLR 0.55-0.64 (after Sasa et al. 1988) ***lobata*** **Edwards**

- Inner lobe of gonocoxite large, broad and setigerous; AR 0.48, fLR 0.51 (after Tokunaga, 1936) ***yoshimurai*** **Tokunaga**

2. Genus *Thienemanniella* Kieffer, 1911

1 - Eyes bare; AR small, 0.41 or less, last segment shorter than the combined length of preceding 5 segments 2

- Eyes pubescent; AR larger than 0.41, and last segment usually longer than thecombined length of preceding 5 segments 3

2 - Scutellum black; antenna with 12 or 13 flagellar segments, AR 0.23-0.35; inner lobe of gonocoxite small, low and broad (after Tokunaga, 1936) ***nipponica*** **Tokunaga**

- Scutellum yellow; antenna with 11 or 12 flagellar segments, AR 0.33-0.41; inner lobe of gonocoxite also low and broad (after Tokunaga, 1936)
flaviscutella **Tokunaga**

3 - Antenna with only 8 flagellar segments, AR 0.46-0.48; ground color of scutum yellow, stripes dark brown, scutellum yellowish brown; inner lobe of gonocoxite broad and with rectangular posterior corner; WL 0.64-0.71 mm, fLR 0.72-0.76 (after Sasa, 1984) ***chuzeduodecima*** **Sasa**

- Antenna with 11-13 flagellar segments 4

4 - Hind tibia conspicuously expanded distally like in *Corynoneura* species (other characters typical of *Thienemanniella*, eyes pubescent, abdominal tergites II-VII with 5 setae); antenna with 12 or 13 flagellar segments, AR 0.46-0.63; WL 0.78-0.81mm, fLR 0.84-0.88, fBR 3.6-4.5; inner lobe of gonocoxite large, with rounded margin and situated near apex; abdominal tergites dark brown along oral and lateral margins and each with a large pale area in the central portion (after Sasa et al., 1988)
oyabedilata **Sasa et al.**

- Hind tibia not expanded distally; gonocoxite lobe low and broad 5

5 - Antenna with 13 flagellar segments, last antennal segment only as long as the preceding 2-3 segments combined, AR 0.42-0.53; WL 1.42-1.53 mm; body almost entirely black; fLR 0.83; inner lobe of gonocoxite large and rectangular (after Sasa & Kawai, 1987) ***morosa*** **Edwards**

- Antenna with 12 flagellar segments, last antennal segment at least as long as 6 preceding segments combined; body with brown or dark brown marks on yellowish brown ground color 6

6 - Gonocoxite lobe more or less rectangular (recorded by Sasa & Kawai, 1987a)
vittata **Edwards**

- Gonocoxite lobe rounded 7

7 - Last antennal segment as long as preceding 6 or 7 segments combined, AR 0.64-0.67; gonocoxite lobe smaller, bearing only microtrichiae; BL 1.3 mm, fLR 0.64 (after Tokunaga, 1936) ***lutea*** **(Edwards)**

- Last antennal segment as long as preceding 8 segments combined, AR 0.85; gonocoxite lobe larger, very broad and bearing several long setae dorsally;BL 1.7 mm, fLR 0.67 (after Tokunaga, 1936)
majuscula **(Edwards)**

BD. Tribe CLUNIONINI

1 - Squama bare; palp not segmented; male antenna composed of 10 segments and without hairs; female antenna with less than 7 segments; tarsi IV bilobed; male wing well developed; female without wings (7 spp.)
Clunio **Haliday**

- Squama fringed; palp segmented; both male and female with well developes wings 2

2 - Palp 2-segmented; tip of tarsus V trilobed (2 spp.)
Telmatogeton **Schiner**

- Palp 4 segmented; Tarsus V simple (1 sp.) ***Thalassomyia*** **Schiner**

Note: Key to species of CLUNIONINI recorded from Japan was given by Tokunaga (1933, 1938).

C. Subfamily DIAMESINAE

Key to tribes

(Cross vein m-cu present; R2+3 simple and not forked; last antennal segment much longer than any of the preceding segments; terminal structure of tibiae as in most Orthocladiinae species)

1 - Cross vein m-cu on or distal to fCu **DIAMESINI** **P.137**
- Cross vein m-cu proximal to fCu **PRODIAMESINI** **P.140**

CA. Tribe DIAMESINI

Key to genera

(* genus not recorded from Japan)

1 - Antepronotum bearing a group of setae dorsally; gonocoxite produced beyond base of gonostylus; tarsi IV cylindrical and longer than tarsi V
* *Protanypus* Kieffer
- Antepronotum bare dorsally; gonocoxite not produced beyond base of gonostylus 2
2 - Wing with macrotrichiae (2 spp. known by female only)
Pseudodiamesa **Goetghebuer** **P.139**
- Wing without macrotrichiae 3
3 - Eyes strongly produced dorsomedially (i.e. ER smaller than 1.0); anal point absent ***Symdiamesa*** **Kieffer** **P.139**
- Eyes not, or scaresely produced dorsomedially (ER 1.0 or larger) 4
4 - Tarsi IV cylindrical and not shorter than tarsi V * *Synpotthastia* Pagast
- Tarsi IV cordiform and shorter than tarsi V 5
5 - Dorsolateral setae of scutum either absent, or very small, decumbent and arising from small pits (3 spp., among which 2 are known only by female)
Heptagyia **Philippi** **P.138**
- Dorsolateral setae long, suberect, and arising from large pale pits 6
6 - Eyes pubescent; wing with microtrichiae (10 spp.) ***Diamesa*** **Meigen** **P.137**
- Eyes bare; wing without microtrichiae (4 spp.) ***Potthastia*** **Kieffer** **P.139**

1. Genus *Diamesa* Meigen, 1838

1 - Wing well developed, more than half as long as body 2
- Wing highly reduced, WL 0.86 mm, BL 4.16 mm (known by female only; collected on snow in Niigata (after Tokunaga, 1964)
breviala **Tokunaga,**

2 - Frontoclypeus without setae; gonostylus immovable and directed backwards; male antenna composed of only 8 segments, AR 0.35; antennal hairs reduced and appearing like female antenna; body dark borwn; anal point absent; BL 3.0 mm, fLR 0.70 (after Tokunaga, 1937)
***astyla* Tokunaga**

- Frontoclypeus with setae as usual; gonostylus movable and directed inwards 3

3 - Eyes pubescent; gonostylus not hooked apically 4

- Eyes bare; gonostylus abruptly hooked inwards at apex; anal point absent; WL 2.38 mm, AR 1.71, DM 0, DL 10:10, fLR 0.77, fBR 3.5
***toyamaflexa*, sp. nov.**

4 - Eyes with normal long pubescence 5

- Eyes with minute dot-like pubescence (known by female only; BL 4.3 mm, AR 0.52, *fLR 0.69 (after Tokunaga, 1937)* ***Diamesa* sp. (No.2)**

5 - Tarsi I, II and III with apical spurs 6

- Tarsi I and II with apical spurs, III without spur 7

6 - Costa produced beyond end of R4+5; BL 4.1 mm; antenna 9 segmented, not plumose, AR 0.81; fLR 0.57-0.58; body largely black; anal point long, widest at base and apically pointed (after Tokunaga, 1936)
***japonica* Tokunaga**

- Costa not produced beyond end of R4+5; BL 2.5-3 mm; antenna also 9 segmented, not plumose, AR 0.4-0.6; fLR 0.64-0.65; body largely dark brown; anal point minute and hyaline (after Tokunaga, 1936)
***alpina* Tokunaga**

7 - Cross vein r-m almost straight 8

- Cross vein r-m distinctly curved (known only by female; body black, BL 4.5 mm, AR 0.73, fLR 0.7-0.8 **sp.(No.1), Tokunaga, 1936**

8 - Antenna 9 segmented, antennal hairs short and sparse, AR about 0.5; BL 4.5 mm, fLR 0.57; body entirely dark brown; anal point long and sharply pointed apically; gonocoxite with three inner lobes; gonostylus stout, curved and apically rounded, with a basal projection and a small apical spine (after Tokunaga, 1936) ***tsutsuii* Tokunaga**

- Antenna 14 segmented as usual, antennal hairs long, numerous and plumose 9

9 - AR 2.43-2.90; gonocoxite with two inner lobes, the dorsal one low, broad and bearing short setae, the ventral one semicircular and bearing many long and stout setae like a fan; anal point long, stout and with an apical process; body entirely black; BL 4.0-6.0 mm, WL 3.06-4.23 mm, fLR 0.74 (after Sasa,1979) ***tsukuba* Sasa**

- AR about 1.06; gonocoxite with two inner lobes, one lobe long, finger-like and bare, the other low, broad and setigerous; anal point simple and constricted in the middle; body dark brown; BL 5.5 mm, fLR 0.69 (after Tokunaga, 1936) ***plumicornis* Tokunaga**

2. Genus *Heptagyia* Philippi, 1865

1 - Body largely pale yellow, with distinct scutal stripes (known by female only) 2

- Body largely black, leg segments uniformly dark brown; male antennal hairhigh-

ly reduced, AR about 0.1; known by male only (after Tokunaga, 1936) ***brevitarsis* (Tokunaga)**

2 - Tarsi I to V of all legs entirely dark brown; tibiae with a distinct pale ring in the middle (after Tokunaga, 1937) ***nipponica* Tokunaga**

- Tarsi I of all legs largely yellow, with an apical dark ring, tarsi II to V entirely dark brown; tibiae largely white, with an apical dark ring (after Tokunaga, 1937) ***eburnea* Tokunaga**

3. Genus ***Potthastia*** Kieffer, 1922

1 - Anal point absent 2

- Anal point present, low, broad and with rounded margin; BL 5.34-5.36 mm, WL 2.72-2.98 mm, AR 2.02, ER 1.24, PN 8-10, DM 0, DL 21-25, PA 10-13, SC 36; RR 0.42-0.48, VR 0.88-0.89, R/Cu 1.11-1.13; tarsi I and II of middle and hind legs with two terminal spurs; tarsi IV cordiform and shorter than tarsi V; gonostylus simple and widest at about middle (after Sasa, 1988) ***montium* (Edwards)**

2 - Ninth tergite bearing long and stout setae on distal half; gonostylus widest at about proximal 1/3, and acutely bent outwards near apex; BL 3.39 mm, WL 2.24 mm, AR 1.62, ER 0.90, PN 8, DM 0, dl 10:11, sc 20, VR 0.97 (after Sasa& Kawai, 1987b) ***matunigra* Sasa et Kawai**

- Ninth tergite without long setae; gonostylus not bent outwards near apex 3

3 - AR 3.35; eyes widely apart from each other; dm 0, front tarsi I and II, and middle and hind tarsi I, II and III with apical spurs, tarsi IV longer than tarsi V in all legs, slightly constricted in the middle and flattened beyond it (after Tokunaga, 1936) ***nigatana* Tokunaga**

- AR 2.0, BL 3.9-6.7 mm, WL 3.11 mm; tarsi I of middle and hind legs with two terminal spurs, tarsi II of the same legs with one terminal spur (after Tokunaga, 1965) ***campestris* (Edwards)**

4. Genus ***Pseudodiamesa*** Goetghebuer, 1939

1 - Tarsi I and II of middle and hind legs with terminal spurs, other tarsi without terminal spur; eyes pubescent; known by female only (after Tokunaga, 1937) ***crassipilosa* (Tokunaga)**

- Tarsi I, II and III of middle and hind legs with terminal spurs; eyes bare; known by female only (after Tokunaga, 1936) ***nivis* (Tokunaga)**

5. Genus ***Syndiamesa*** Kieffer, 1918

1 - Tarsi I and II of middle and hind legs with two terminal spurs, other tarsi witout terminal spur 2

- Tarsi I, II and III of middle and hind legs with two terminal spurs 4

2 - Wing bicolored, proximal 1/3 yellowish and distal 2/3 brownish; ground color of scutum yellow, stripes dark brown; known by female only (after Tokunaga,1937) ***bicolor* Tokunaga**

- Wing unicolorous; body entirely black **3**

3 - Segment II of palp distinctly produced beyond base of III; BL 5.66-7.04mm, WL 4.03-4.51 mm, AR 3.38-4.26, ER 0.79-1.00, PN 10-12, DM 0, DL 19-28, PA 16-24, SC 45-64; anal point short and needle-like (after Sasa & Kawai, 1985) ***takatensis* Tokunaga**

- Segment II of palp not produced apically; BL 4.5mm, AR 2.05, DM 0, DL 14; eyes each with a long dorsomedial projection, ER small; anal point long and needle-like; gonocoxite with a large inner lobe (after Tokunaga, 1936) ***lanceolata* Tokunaga**

4 - Front tarsus IV shorter than front tarsus V (known by female only) ***Syndiamesa* sp. (No.1) of Tokunaga, 1936**

- Front tarsus IV longer than front tarsus V **5**

5 - Anal point absent **6**

- Anal point present **7**

6 - Front tarsi without long beards; gonocoxite with a low and broad inner lobe near base; BL 6.11, WL 4.69, AR 2.67 (after Tokunaga, 1964) ***yosiii* Tokunaga**

- Front tarsi with long beards, fBR 6.2; gonocoxite without inner lobe; BL 6.13 mm, WL 3.69 mm, AR 2.37, ER 0.55; wing vein Cu2 strongly curved near apex (*Syndiamesa* sp. of Sasa, 1984, p.93) ***chezemagna* sp. nov.**

7 - Antepronotum without setae; BL 5.7mm, AR 2.9, eyes widely separated; anal point short, broadest at base and apically rounded, thickly covered with microtrichiae (after Tokunaga, 1936) ***kashimae* Tokunaga**

- Antepronotum with lateral setae; BL 5.3 mm, AR 1.65: eyes widely separated; anal point short, narrow and cylindrical (after Tokunaga, 1936) ***montana* Tokunaga**

CB. Tribe PRODIAMESINI

Key to genera

1 - Gonocoxite with a pair of darkly chitinized elongate appendages arising from an elevated base (2 spp.) ***Prodiamesa* Kieffer** **P.140**

- Gonocoxite without such appendages at base (1 sp.) ***Monodiamesa* Kieffer** **P.140**

1. Genus *Monodiamesa* Kieffer, 1921

One species, ***bathyphila* (Kieffer, 1918)** was recorded by Sasa & Kawai (1987a) from Lake Biwa. WL 3.56 mm, ER 0.55-0.56, AR 2.48 (this data was missed from the original description), DM 0, DL 11-19, PA 5-6, SC 24-30, VR 0.98, fLR 0.80, fBR 2.6.

2. Genus *Prodiamesa* Kieffer, 1911

1 - Anal point long, widest at base and apically rounded, covered with microtrichiae on basal 1/3; basal appendage of gonocoxite tapering towards sharply

pointed apex; both dorsal and ventral appendages of gonocoxite well developed and much longer than wide; WL 3.69mm, AR 2.37, fLR 0.65, fBR 6.2 (*Monodiamesa* sp. of Sasa, 1984, p.91)

***chuzenigra* sp. nov.**

- Anal point absent; basal appendage of gonocoxite parallel-sided and apically rounded; gonocoxite also with two inner lobes, dorsal one much smaller and lower than the ventral one; WL 3.16-3.37mm, AR 2.05-2.31, fLR 0.82-0.87, fBR 2.8-4.9 (after Sasa & kawai, 1985)

***nagaii* Sasa et Kawai**

D. Subfamily TANYPODINAE

Key to Tribes and Genera

(rearranged from Fittkau, 1962, p.80, and Pinder, 1978, p.20; * genus not recorded from Japan)

1 - Tarsi IV cordiform and shorter than tarsi V; wing without macrotrichiae; claws forked apically — Tribe **COELOTANYPODINI** — **2**

- Tarsi IV cylindrical and longer than tarsi V — **3**

2 - fCu distal to m-cu (6 spp.) — ***Clinotanypus* Kieffer**

- fCu proximal to m-cu — * *Coelotanypus* Kieffer

3 - fCu distal to m-cu — **4**

- fCu proximal to m-cu — **6**

4 - Distance between fCu and m-cu less than 1/3 the length of Cul (1 sp.) — Tribe **TANYPODINI** genus *Tanypus* Meigen

- Distance between fCu and m-cu at least the half of length of Cul — Tribe **PROCLADIINI** — **5**

5 - Wing with macrotrichiae, at least apically (8 spp.) — ***Procladius* Skuse**

- Wing without macrotrichiae — * *Psilotanypus* Kieffer

6 - Postnotum with a double row of long bristles medially; costa extending beyond end of R4+5 at least twice as long as r-m — Tribe **MACROPELIPIINI** — **7**

- Postnotum bare; costa extending beyond end of R4+5 not more than the length of r-m — Tribe **PENTANEURINI** — **11**

7 - - Terminal spurs of tibiae simple and spine-like, not serrated laterally: wing with macrotrichiae only in distal portion — * *Anatopynia* Johannsen

- Terminal spurs of tibiae flat and scale-like, serrated laterally — **8**

8 - Large pulvilli present — **9**

- Pulvilli absent — **10**

9 - Gonostylus long, about 2/3 the length of gonocoxite; wing with 2 dark transverse bands (1 sp.) — ***Psectrotanypus* Kieffer**

- Gonopstylus shorter, about 1/2 as long as gonocoxite; wing with 3 dark transverse bands (? 1 sp.) — ***Apsectrotanypus* Fittkau**

10- Claws pointed apically; scutum with a small median hump (5 spp.) — ***Macropelopia* Fittkau**

- Claws broad and serrated apically; scutum without a median hump
* *Natarsia* **Fittkau**

11- Tibiae with 3 conspicuous dark rings; gonostylus with a peculiar apical appendage (1 sp.) ***Ablabesmyia* Johannsen**

- Tibiae unicolorous or with only one dark ring; gonostylus without such an apical appendage **12**

12- Gonocoxite with a basal lobe **13**

- Gonocoxite without a basal lobe **17**

13- Anal point slender, about twice as long as wide * *Xenopelopia Fittkau*

- Anal point not well developed, wider than long **14**

14- Middle tarsus III with a group of long setae apically; palp pale **15**

- Middle tarsus III without long setae apically; palp dark **16**

15- Scutum with a small median hump; wing unmarked, or only faintly marked; cross vein pale (3 spp.) ***Conchapelopia* Fittkau**

- Scutum without median hump; wing distinctly marked, cross vein dark ***Rheopelopia* Fittkau**

16- Femora with a dark brown apical ring; wing with dark marks, cross veins dark * *Thienemannimyia* Fittkau

- Femora unicolorous; wing unmarked * *Arctopelopia* Fittkau

17- Wing membrane with pale spots on dark ground * *Guttipelopia* Fittkau

- Wing unmarked, or with dark spots on pale area **18**

18- Eyes pubescent (1 sp.) ***Nilotanypus* Kieffer**

- Eyes bare **19**

19- Costa ending proximal to tip of M; abdomen not banded yellow and black **20**

- Costa ending usually above tip of M; if ending proximally, then abdomen has distinct yellow and black bands **23**

20- Hypopygium with conspicuous parameres; hind tibia with two apical spurs **21**

- Hypopygium without conspicuous parameres; hind tibia with one or no apical spur **22**

21- Gonocoxite roughly cylindrical, about 2.5 times as long as wide; outer spur at the tip of middle and hind tibiae twice as long as inner spur; hind tibia with a terminal comb; hypopygium with very long and dark parameres (1 sp). ***Paramerina* Fittkau**

- Gonocoxite bean-form, less than twice as long as wide; terminal spurs on middle and hind tibiae almost equal in length; hind tibia without terminal comb; parameres present, but not so dark ***Pentaneura* Phillipi**

22- Hind tibia with one terminal spur * *Monopelopia* Fittkau

- Hind tibia without terminal spur * *Labrundinia* Fittkau

23- Hind tibia without apical comb composed of free spurs, and with two comb scales (1 sp.) ***Trissopelopia* Kieffer**

- Hind tibia with a well developed apical comb composed of free spurs **24**

24- Both terminal comb scales of hind tibia with a long tooth; wing unmarked **25**

- Outer comb scale of hind tibia with a short tooth; wing with dark marks (1 sp.) ***Zavrelimyia* Fittkau**

25- Posterior margin of ninth tergite with a pair of rounded lobe flanking anal point

* *Telmatopelopia* Fittkau
- Posterior margin of ninth tergite without rounded lobe flanking anal point (1 sp.) ***Krenopelopia* Fittkau**

Note: Key to species of each genus will be compiled in future when additional information be accumulated on this group of midges.

Key to species of TANYPODINAE recorded by Tokunaga (1937a,b, 1938) from Japan, Taiwan and Sakhalin

(The generic names followed the old system adopted by the original author)

1 - Tarsi IV cordiform, shorter then tarsi V (6 spp.) *Clinotanypus* Kieffer
- Tarsi IV cylindrical, longer than tarsi V **2**

2 - Cross vein m-cu proximal to fCu **3**
- Cross vein m-cu distal to fCu **4**

3 - Distance between fCu and m-cu at least half the length of Cul (8 spp.) *Procladius* Skuse **P.144**
- Distance between fCu and m-cu less than one third the length of Cul (1 sp.) *Tanypus* Meigen

4 - Costa extending much beyond end of R4+5 (6 spp.) *Anatopynia* Johannsen **P.143**
- Costa not extending beyond end of R4+5 (18 spp.) *Pentaneura* Philippi **P.143**

Genus ***Anatopynia*** Johannsen, 1905

1 - Legs with pulvilli **2**
- Legs without pulvilli **3**

2 - Two median scutal stripes distinctly dark *varia* (Fabricius)
- Two median scutal stripes indistinct, yellowish *yoshimurai* Tokunaga

3 - Wing with dark marks in cell R5 (between R4+5 and M) **4**
- Wing without dark marks in cell R5 **5**

4 - Wing with cross veins dark *nebulosa* (Meigen)
- Wing with cross veins pale *kibunensis* Tokunaga

5 - Wing without dark spots at ends of radial veins *goetghebueri* Kieffer
- Wing with dark spots at ends of radial veins *japonica* Tokunaga

Genus ***Clinotanypus*** Kieffer, 1918

1 - Wing with a transversal dark band **2**
- Wing without transversal dark band **3**

2 - All femora entirely yellow *formosae* Kieffer
- All femora blackish apically *decempunctatus* Tokunaga

3 - Thorax blackish **4**
- Thorax yellowish **5**

4 - Thorax entirely black *immaculatus* Kieffer

- Thorax with paired yellow spots *japonicus* Tokunaga
5 - Wing with marginal areas of r-m hyaline *lampronotus* Kieffer
- Wing with marginal areas of r-m dark *sugiyamai* Tokunaga

Genus ***Pentaneura*** Philippi, 1865

1 - Cu1 ending far beyond level of end of R4+5 *minutus* Tokunaga
- Cu1 ending before level of R4+5 **2**
2 - Wing with markings **3**
- Wing without markings **7**
3 - Tibia and tarsi I each with a dark median ring *monilis* Linnaeus
- Tibia and tarsi I without median rings **4**
4 - Postnotum whitish or yellowish *octopunctata* Tokunaga
- Postnotum brownish or darkish **5**
5 - Wing with one or more transversal band **6**
- Wing without complete transversal band *monticola* Tokunaga
6 - Wing with one transversal band *fusciclava* Kieffer
- Wing with two transversal bands *maculipennis* Zetterstdt
7 - Postnotum whitish or yellowish **8**
- Postnotum brownish or darkish **10**
8 - Scutum with dark or brown spots **9**
- Scutum without dark or brown spots *alba* Tokunaga
9 - Scutum with 8 dark spots *japonica* Tokunaga
- Scutum with 4 dark spots *melanops* Meigen
10- R2+3 incomplete, atrophied before costal margin **11**
- R2+3 complete, ending on costal margin **14**
11- Median stripes of scutum distinct, as dark as lateral stripes **12**
- Median stripes of scutum indistinct, paler than lateral stripes **13**
12- AR about 1.7; abdomen yellow, tergites II to VI with a brown band on oral margin *longipennis* Tokunaga
- AR about 0.9; abdomen white, tergites II to VI each with a T-shaped pale brown markings on oral margin *okadai* Tokunaga
13- Abdominal tergites I and II without bands *divisa* Walker
- Abdominal tergites I and II each with a dark band *kyotoensis* Tokunaga
14- Abdominal tergite IV with a dark band *multifascia* Tokunaga
- Abdominal tergite IV without dark band *gracillima* Kieffer

Note: *Pentaneura circumdata* Tokunaga, 1940, was described by female collected at Sizyukei(Taiwan), and according to the original description, it is allied to *P. maculippenis* Zetterstedt, but the vertex of head is not dark, the lateral scutal stripes have no black spots at caudal end, the distance between tips of M and R4+5 is greater than that between tips of M and Cu1 (these are subequal in *maculipennis*), and the basal band of wing is much broader.

Pentaneura pleuralis Tokunaga, 1940, was recorded by male and female collected also at Sizyukei (Taiwan), which is quite distinctive in the poses-sion of a

dark central pleural spot and a dark band on wing, according to the original description.

Genus ***Procladius*** Skuse, 1887

1 - Macrotrichiae of wing completely reduced
* subgenus *Psilotanypus* Kieffer

- Macrotrichiae of wing present at least on tip subgenus *Procladius* Skuse **2**

2 - Ground color of scutum yellow **3**
- Ground color of scutum black **4**

3 - Mediocubital ratio 0.6-0.7 *sagittalis* Kieffer
- Mediocubital ratio about 0.8 *choreus* Meigen

4 - Scutal stripes confluent **5**
- Scutal stripes separated **7**

5 - Mediocubital ratio about 1; female antenna 13 segmented
insularis var. *transiens* Kieffer

- Mediocubital ratio less than 1; female antenna 14 segmented **6**

6 - Wing with three small white spots in marginal area *iris* Kieffer
- Wing without white spots in marginal area *crassinervis* Zetterstedt

7 - Wing with white spots on distal area *insularis* Kieffer
- Wing without white spots on distal area **8**

8 - Antennal ratio of male about 1.4; female antenna 14 segmented
lacteiclavus Kieffer

- Antennal ratio of male about 1.9 or higher **9**

9 - Antennal ratio at most 1.9; gonostylus with a blunt basal lobe; female antenna 13 segmented *nipponicus* Tokunaga
- Antennal ratio about 2.2; gonostylus without basal lobe (no account on female morphology (after Tokunaga, 1940) karahutonis Tokunaga

Part 3. Taxonomic Notes on some Japanese Chironomidae

1. Description of *Okayamayusurika kojimaspinosa*, gen. et sp. nov.

Genus *Okayamayusurika* Sasa, gen. nov.

Genotype: *Okayamayusurika kojimaspinosa*, sp. nov., monotypic

Diagnostic characters: Eyes bare, reniform. Antenna with 13 flagellar segments, AR 1.6-1.8, without apical seta but with a long subapical seta. Dorsomedial setae of scutum present but minute, dorsolateral setae well developed. Squama bare. Wing membrane bare and finely granular. Costa extending much beyond tip of R4+5, tip of R4+5 slightly beyond tip of Cu1, Cu2 strongly curved, anal vein extending beyond fCu. fLR less than 0.5. Pulvilli absent. Anal point absent. Gonocoxite large, roughly conical, and without inner lobe. Gonostylus with a conspicuous process on lateral side near apex.

The above combination of characters indicate that it belongs to the tribe Metriocnemini of subfamily Orthocladiinae, but does not fit to any of the previously known genera. In the key prepared by Pinder (1978), it comes out to the genus *Bryophaenocladius*, since eyes, wings and squama are all bare, costa strongly produced beyond tip of R4+5, anal vein extends to beyond fCu, and AR is more than 1.2, but all the previously known species of this genus have a large anal point, and gonocoxite bears a conspicuous inner lobe. Most characteristic to the present species is the presence of a conspicuous lateral process near apex of gonostylus.

Okayamayusuriuka kojimaspinosa Sasa, sp. nov. (Plate 1-A)

Two males were collected with insect net on the shore of highly eutrophicated lake, Kojimako (Okayama), on March 10, 1986. Holotype: No. A 92: 68. Paratype: No. A 92:69.

Male: BL 2.38, 2.48 mm, WL 1.52, 1.70 mm. Ground color of scutum dark brwon, stripes, scutellum and postnotum black, halteres, legs and abdominal tergites dark brown. Head in Fig.1-A1. Eyes bare, reniform and inner margin slightly concave, ER 1.21, 1.36. Antenna with 13 flagellar segments, AR 1.80, 1.59, AHR 0.65, 0.61, last segment not swollen apically, without apical seta but with a long subapical seta. SO 6:6, 8:8, CL 8, 10. Antepronotum (Fig.1-A2) well developed, united in the middle, with only 1 or 2 lateral setae. Scutum and scutellum in Fig.1-A4. DM 8, 10, all minute. DL 12:14, 17:20, all well developed and very long (112-176 microns), arising from large pale pits. PA 6:6, 7:7, SC 10, 12.

Wing in Fig.1-A3. Squama bare. Wing membrane bare, slightly bluish and very finely granular. Anal lobe obtuse. Costa extending much beyond tip of R4+5. RR 0.46, 0.32, VR 1.18, 1.08, R/Cu 1.06, 1.01. Cu2 strongly curved at about middle. Anal vein extending beyond fCu. Leg segments relatively long and slender, fLR 0.47, 0.46, mLR 0.42, 0.41, hLR 0.52, 0.53 (all unusually small). Tarsi with long beards, fBR 4.0, 4.4, mBR 3.9, 3.4, hBR 7.3, 7.6. Front tibia with a long, curved and barbed apical spur (52 microns, Fig.1-A5). Middle tibia with two short terminal spurs (16, 23 microns, Fig.1-A6). Hind tibia with a long terminal spur (35 microns), a short terminal spur (12 microns), and a terminal comb composed of 10 free spurs (12-22

microns, Fig.1-A7). Tarsi IV cylindrical and longer than tarsi V in all legs. Pulvilli absent, empodium about half as long as claws.

Abdominal tergites with relatively large numbers of setae (Fig.1-A8). Hypopygium in Fig.1-A9. Ninth tergite with rounded posterior margin bearing conspicuous microtrichiae. Anal point absent. Gonocoxite large and roughly conical, without inner lobe. Gonostylus with slightly convex inner margin, and with a sharply pointed process on lateral side near apex (Fig.1-A10).

2. Description of *Smittia kojimagrandis* Sasa, sp. nov. (Plate 1-B)

A male was collected on the shore of Lake Kojimako (Okayama), on March 11, 1986 (No. A 92:89, holotype).

Male: BL 2.38 mm, WL 1.76 mm. Body almost uniformly black. Eyes pubescent, reniform, ER 1.32. Antenna with 13 flagellar segments, AR 2.11, AHR 0.59, last segment slightly swollen apically and with a short but strong apical seta. SO 12:12, CL 8. Antepronotum (Fig.1-B1) united in the middle, with 2:2 lateral setae. DM 8, all minute, DL 8:8, PA 4:4, SC 8. Wing in Fig.1-B3. Squama bare, anal lobe obtuse, wing membrane bare and very finely granular. Costa extending much beyond tip of R4+5, RR 0.38, VR 1.26, R/Cu 1.04. Cu2 strongly curved. Anal vein extending beyond fCu. Terminal structure of tibiae as in other members of this genus (Figs.1-B4,5,6). fLR 0.55, mLR 0.47, hLR 0.58, fTR 0.12, fBR 7.4, mBR 6.2, hBR 7.5. Pulvilli absent.

Hypopygium in Fig.1-B8. Anal point robust, widest at base and covered with microtrichiae on basal half, distal half bare and almost parallel-sided. Inner lobe of gonocoxite situated near the base, much longer than wide, apically rounded and with microtrichiae on inner side. Gonostylus peculiar to this species, widest near apex and tapering towards base, with a stout apical spur, and a rounded subapical tooth which is about as wide as long.

Remarks: This species is somewhat related to *Smittia pratora*, S. *nudipennis*, *S.* edwardsi and *S. itachipennis*, in that anal point is robust and apical half is bare, but differs from *pratora* in that eyes are pubescent, from *nudipennis* in that anal lobe of wing is not flat but obtuse and R4+5 is ending above tip of Cul, and from *edwardsi*, *itachipennis* and all the other species in that inner lobe of gonocoxite is large, located near base and longer than wide, and subapical tooth of gonostylus is narrow and semicurcular. Anal point of the present species is apparently stouter and longer than that of the related species, and bears stronger microtrichiae.

3. Description of *Pseudosmittia* sp. kojimatertia (Plate 4-B)

A male was collected with insect net on the shore of Lake Kojima on May 2, 1987 (No. A 133:98)

Male: BL 2.04 mm, WL 1.08 mm. Body largely brown, with dark brown or black marks; ground color of scutum brown, scutal stripes and postnotum black, legs brown, abdominal tergites dark brown. Eyes bare, reniform and widely apart from each other, ER 1.62. Antenna both missing. SO 6:6. CL 6. Antepronotum (Fig.4-B1) deeply divided in the middle, with only one lateral seta on each side. Scutum and scutellum in Fig.4-B2. Scutum with a central tubercle bearing a pair of minute setae,

DM otherwise absent. DL 10 on each side, PA 3:3, SC 4. Wing bare, very finely granular. Squama bare, anal lobe obtuse. Costa not extending beyond tip of R4+5. R2+3 ending closer to tip of R4+5 than to tip of R1, RR 0.73. Tip of R4+5 much proximal to tip of wing and even to tip of Cu1, R/Cu 0.91. fCu much beyond r-m, VR 1.33. Anal vein ending proximal to fCu. Tip of front tibia in Fig.4-B3. Tarsi of all legs missing. Abdominal tergites with rather reduced numbers of setae (Fig.4-B4). Hypopygium in Fig.4-B5. Anal point somewhat triangular, with numerous microtrichiae and two short setae on both sides. Inner lobe of gonocoxite large and acutely angulate. Gonostylus long, slender, apically pointed and with concave inner margin, with a strong apical spur.

The above morphological characters indicate that this is a typical member of genus *Pseudosmittia* Goetghebuer, 1932, as redefined by Brundin (1856) and Pinder (1978), but is characteristic in the structure of anal point, inner lobe of gonocoxite, and gonostylus, and is probably a new species. However, since both antenna and all tarsi are missing from the presently available single specimen, the scientific name is reserved until additional specimens become available.

4. Notes on *Spaniotoma (Smittia) bifurcata* Tokunaga, 1936

This species is provisionally classified into the genus *Pseudosmittia* Goetghebuer, 1932, by the following reason.

This species was described by Tokunaga (1936c, p.310) together with other *Spaniotoma* and *Tanytarsus* species collected from tide pools or on sea-shore. The description was made with males swarming on a gravelly tidal zone. According to the original description, WL about 1.06 mm, body largely dark brown, thorax black and halteres yellowish white. Eyes bare, antenna 14 segmented, AR about 0.7. Pronotum reduced. Wing hyaline, without macro- and microtrichiae, squama bare, costa not produced beyond tip of R4+5; R4+5 ending proximal to tip of Cu1; R2+3 ending close to tip of R4+5; fCu much beyond r-m; Cu2 almost straight and forked like figure Y; anal vein ending proximal to fCu. Pulvilli absent. Anal point triangular and with microtrichiae. Inner lobe of gonocoxite extremely long, finger-like. Gonostylus long, slender, inner margin slightly concave and apically pointed.

Based on these characters, Goetghebuer (1842, p.110) placed this species into subgenus *Orthosmittia* Goetghebuer, 1940, of genus *Smittia* Holmgren, 1859. However, according to the more recent systems of classification of the subfamily Orthocladiinae presented by Brundin (1956) and Pinder (1978), the above morphological characters seem to fit better to the genus *Pseudosmittia* 1932 than to genus *Orthosmittia*. In the latter, squama has fringe hairs, which are absent in the present species. According to Brundin (1856, p.165), all species of *Pseudosmittia* have no dorsomedian setae but with a Mesonotalhoecker (central tubercle on scutum), but Tokunaga (1936) gave no description on the character of scutum of the present species.

5. *Diamesa matuimpedita*, sp. nov. (Plate 2)

A male with a highly complicated structure of hypopygium was collected with

a light trap operated on the ninth floor of an apartment house at the side of River Matsukawa, Azumicho, Toyama, on February 16, 1987 (No.A 146:01).

Male: BL 4.76 mm, WL 3.12 mm. Body almost uniformly black or dark brown. Head in Fig.2-1. Eyes pubescent, reniform and without distinct dorsomedial projection, ER 0.75. Antenna (Fig.2-2) with only 8 flagellar segments, antennal hairs highly reduced and appearing that of female, AR 0.46, AHR 0.19, last segment with an apical seta. SO 20:20, distributed in multiple rows, CL 8. Antepronotum (Fig.2-3) slightly separated in the middle, with 14:14 lateral setae. Scutum and scutellum in Fig.2-5. DM 0. DL 13:13, all with a large pale base, PA 7:7, SC 22 in two transverse rows.

Wing membrane without macrotrichiae but granular in appearance, venation in Fig.2-4. SQ 22:22, RR 0.26, VR 0.87, R/Cu 1.13. Costa extending slightly beyond tip of R4+5, and reaching almost to tip of wing. Front tibia with a long barbed terminal spur 53 microns long (Fig.2-6). Middle tibia with two barbed terminal spurs 54 and 55 microns long (Fig.2-7). Hind tibia with two terminal spurs 85 and 82 microns long, and a terminal comb composed of 15 free spurs 42-77 microns long (Fig.2-8). fLR 0.61, mLR 0.46, hLR 0.63, fTR 0.09, fBR 1.8, mBR 1.5, hBR 1.4. Tarsi IV cordiform and shorter than tarsi V in all legs. Pulvilli absent, claws are apically barbed and pointed.

Hypopygium (Figs.2-9,10) highly complicated in structure. Anal point robust, widest at base and apically rounded. Ninth tergite with a long sheath in the middle covering anal point, and with more than 20 short setae on both sides of anal point. Gonocoxite with a long and complecated inner lobe, which has a chitinized rectangular lobe bearing numerous strong setae on the ventral side. Gonostylus simple, strongly expanded medially near the base and tapering towards apex, with a small apical spur.

Remarks: This species is regarded as a member of genus *Diamesa*, since eyes are pubescent and without dorsomedial projection, wing membrace without macrotrichiae and granular, cross vein m-cu is present and connected with Cu1, tarsi IV is cordiform, and terminal structure of tibiae is typical to the sub-family Diamesinae. However, it is quite unusual in that male antenna has only 8 flagellar segments and hairs are highly reduced, appearing like female antenna. The structure of ninth tergite, anal point and inner lobe of gonostylus is also quite unusual. Among the previously known species of this genus, it is some-what related to *Diamesa astyla* Tokunaga, 1936, in that antenna has only 8 flagellar segments, antennal hairs are reduced and looks like that of female, but in *astyla* anal point is absent and genostylus is ankylosed with gonocoxite.

6. *Diamesa toyamaflexa* sp. nov. (Plate 3)

A male emerged on 9 February from a bottom sample collected on 26 December from an irrigation ditch at the side of Kumano River, Toyama-shi (No. 146:06).

Male: BL 4.16 mm, WL 2.38 mm. Scutum, scutellum and postnotum entirely black, halteres brown, legs dark brown, abdominal tergites largely dark brown, II to V with a median longitudinal black band, hypopygium dark brown. Head in Fig.3-1. Eyes bare, inner margin concave but without distinct dorsomedial projection, ER

1.07. Antennal flagellum 13 segmented, last segment not expanded apically, and with an apical seta, AR 1.71, AHR 0.58. Palp with 4 flagellar segments, all relatively long, 96x26, 147x30, 166x26, 204x17 microns in length and diameter.

Antepronotum (Fig.3-2) almost parallel-sided and thickly united in the middle, without dorsal setae and with 4:4 lateral setae. Scutum and scutellum in Fig.3-3. DM 0, DL 10:10, all arising from large pale pits. PA 10:10, SC 21. Wing in Fig.3-4. SQ 24: 26. Wing membrane brownish, without macrotrichiae, and finly granular. Anal lobe strongly produced. Costa extending much beyond tip of R4+5, and reaching to tip of wing. R2+3 ending about midway between tips of R1 and R4+5, RR 0.42. Cross vein m-cu united with Cu1 at slightly distal to fCu. fCu proximal to r-m, VR 0.93. Cu1 ending much proximal to tip of R4+5, R/Cu 1.12. Cu2 almost straight. Anal vein extending much beyond fCu, and almost reaching to wing margin.

Front tibia with a long terminal spur (84 microns; Fig.3-5). Middle tibia with two short terminal spurs (both 50 microns long; Fig.3-6). Hind tibia with a long terminal spur (78 microns), a short terminal spur (44 microns), and a terminal comb composed of 9 free spurs (20-55 microns; Fig.3-7). Middle and hind tarsi I with two short terminal spurs, middle and hind tarsi II with one short terminal spur, other tarsi without terminal spur. Tarsi IV of all legs slightly expanded apically, and all shorter than tarsi V of the respective legs (Fig.3-8). Pulvilli absent, claws are apically forked and with a few setae at base, empodium very small. fLR 0.77, mLR 0.55, hLR 0.59, fTR 0.11, fBR 3.5, mBR 3.2, hBR 3.4.

Abdominal tergites with numerous setae which are almost evenly distributed. Hypopygium in Fig.3-9. Anal point absent. Ninth tergite small, posterior margin only slightly produced, with long lateral setae and 21 short setae in the middle portion. Gonocoxite without inner lobe. Gonostylus simple, widest at about basal 1/3 and tapering towards apex, and abruptly curved inwards at apex, like a hook (Fig.3-10).

Remarks: This species is designated as a member of genus Diamesa, since wing is bare, cross vein r-m is connected with Cu1, R2+3 is not forked, antepronotum is bare dorsally, eyes are not strongly produced dorsally, and tarsi IV is shorter than tarsi V. Among the species of this genus known from Europe, it is most closely related to *Diamesa incallida* (Walker) in that anal point is absent and gonostylus is not expanded medially, but differs essentially in the shape of gonostylus (not apically hooked but with a chitinized tooth near apex in *incallida*). On the other hand, some 10 species of *Diamesa* have been recorded from Japan, but the present species differs from all of them in that eyes are bare, anal point is absent, and gonostylus is hooked apically, as shown in the key in Part 2.

7. *Prodiamesa chuzenigra*, Sasa, sp. nov.

This is a new scientific name for *Prodiamesa* sp. of Sasa (1984, p.91) described by male, female and pupa emerged from bottom samples collected from Lake Chuzenji, Nikko National Park (Tochigi) in 1979 and 1981. Holotype: male, No.A 52: 01, emerged on May 23, 1979 in the laboratory of NIES. Its pupal skin is mounted in No.A 52:02. Paratype: male, A 52:03, emerged May 8, 1981. A female (A 52:04), emerged May 8, 1981, and two larvae (A 52:05, 06) were collected from the same bottom sample of Shobuhama, Lake Chuzenji.

As described in details in the original paper by Sasa (1984), the male of this species has a darkly chitinized elongate appendage at the base of gonocoxite characteristic to this genus. Among the previously known species of this genus, it is somewhat related to *P. rufovittata* Goetghebuer in that gonostylus is simple, anal point is robust and gonocoxite bears two large inner lobes, but differs essentially from the latter in that the present species bears some 20 setae on ninth tergite (only 4 in the latter according to Pinder, 1978, Fig.96B, and in the shape of inner lobes of gonocoxite. Sasa & Kawai (1985) recorded another species of this genus from Toyama, *P. nagaii*, which differs from the present species in that anal point is absent and the shape of appendages of gonocoxite is remarkably different.

Standard measurement data of holytype and paratype males: BL 6.43, 7.35 mm, WL 3.16, 4.10 mm, AR 2.68, 2.85, AHR 0.49, 0.61, SO 12-16, CL 14, 16, PN 4-6, DM 0, DL 12-14, PA 5-10, SC 30, 30, SQ 37-40, RR 0.47, 0.49, VR 1.05, 0.97, R/Cu 1.12, 1.11, fLR 0.81, 0.83, mLR 0.49, 0.50, hLR 0.56, 0.58, fTR 0.13, 0.14, fBR 1.7, 1.7, mBR 1.5, 1.7, hBR 1.5, 2.3.

8. *Syndiamesa chuzemagna* Sasa, sp. nov.

This is a new scientific name for *Syndiamesa* sp. of Sasa (1984, p.93), described with a single male collected on the shore of Lake Chuzenji on 8 May 1981. Holotype: No.A 52:11. This species can be easily differentiated from *S. edwardsi* Pagast of Europe by the shape of gonostylus, and can be identified from among 7 Japanese species by the key in Part 2 of this paper.

Standard measurements of the holotype: BL 6.13 mm, WL 3.19 mm, AR 2.37, AHR 0.57, ER 0.55, SO 46:48, CL 24, PN 8:8, DM 6 (all minute), DL 26:26. PA 10:10, SC 40, SQ 32, RR 0.53, VR 0.90, R/Cu 1.23, fLR 0.65, fBR 6.2.

9. *Krenopelopia yunouresia* Sasa, sp. nov. (Plate 4-A)

Males and females were collected with insect net while swarming on the shore of Lake Yunoko (Tochigi), July 31, 1976. 12 males and 3 females among them were dissected and mounted on slides for morphological study (No.A 52:21-29). Holotype: No.A 52:23b. Paratypes: other 11 males and 3 females.

Male: BL 3.04-3.46 (3.25 in average of 10) mm, WL 1.70-1.94 (1.81) mm. Body largely yellow, with brown marks; ground color of scutum yellow, scutal stripes, scutellum and postnotum brown, leg segments almost uniformly brown, abdominal tergites I to V brownish yellow for oral 2/5 and yellow for caudal 3/5, VI and VIII brown, VII largely brown and with a pair of lateral yellow areas, hypopygium yellowish brown. Head in Fig.4-A1. Eyes bare, each with a dorsomedial projection, ER 0.15-0.31 (0.26). Antenna composed of 13 flagellar segments, last segment short and penultimate segment longest, AR 1.34-1.64 (1.45), AHR 0.50-0.52 (0.56). SO 12-14 (12.8), CL 14-18 (16.1), Antepronotum (Fig.4-A2) separated in the middle, with 2 or 3 (2.5) lateral setae. Scutum and scutellum in Fig.4-A4, DM 26-34 (30.6)in double rows, DL 26-39 (31.0), PA 10-16 (11.9), SC 15-21 (18.1).

Wing in Fig.4-A3. Wing membrane unmarked, with numerous macrotrichiae, squama with 16-25 (21.4) fringe hairs. Costa slightly extending beyond tip of R4+5.

R1 and R4+5 running closely, R2+3 is connected with R1 near its tip and ending closer to tip of R1 than to tip of R4+5, RR 0.23-0.43 (0.34). Tip of R4+5 distal to tip of Cu1, R/Cu 1.05-1.09 (1.08). Cross vein m-cu slightly distal to fCu, and fCu is proximal to r-m, VR 0.75-0.81. Anal vein extending much beyond fCu.

Front tibia with a triangular terminal scale, and a terminal spur composed of a long, slender main shaft 48 microns long, and two or three short lateral barbs (Fig. 4-A5). Middle tibia with a long terminal spur (73 microns) and a short terminal spur (22 microns), both barbed (Fig.4-A6). Hind tibia with a long barbed terminal spur (77 microns), a short barbed terminal scale (30 microns), and a terminal comb with 5 free, simple spurs (Fig.4-A7). fLR 0.84-0.89 (0.86), mLR 0.98-1.02 (1.00; unusually large value), hLR 0.83-0.87 (0.84), fTR 0.12-0.14 (0.13), fBR 4.0-5.3 (4.9), mBR 4.0-6.5 (5.2), hBR 4.6-7.2 (6.0). Pulvilli absent, empodium short, claws are apically pointed and not forked.

Hypopygium in Fig.4-A8. Ninth tergite short and narrow. Phallapodemes relatively long and apically hooked. Gonocoxite roughly egg-shaped, with a setigerous pad at the base. Gonostylus simple, tapering towards pointed apex, and with a large apical spur, and with 4 relatively long setae.

Female: BL 2.06, 2.16, 2.18 mm, WL 1.80, 1.84, 1.84 mm. Body coloration as in male, with brown marks on yellow ground color. Head in Fig.4-A9. Eyes each with a long and narrow dorsomedial projection, ER 0.24, 0.29, 0.30. Antenna composed of a pedicel and 11 flagellar segments, AR 0.23, 0.40, AHR 0.23. SO 9-12 (10.5), CL 19, 20, 24, PN 2 or 3 (2.8), DM 30, 34, 36, DL 40-61 (54.8), PA 14-23 (17.7), SC 26, 28, SQ 19-27 (21.2), RR 0.35, 0.36, VR 0.84, 0.85, R/Cu 1.12, 1.14, fLR 0.91, mLR 0.84, hLR 0.84, fTR 0.14, fBR 4.3, mBR 5.8, hBR 6.3. Spermathecae 3 (Fig.4-A11), all oval and not pigmented, easily overlooked. Cercus (Fig.4-A10) with a complicated shape.

Remarks: This species belongs to *Pentaneura* in wider sense and to *Krenopelopia* Fittkau, 1962, since cross vein m-cu is distal to fCu, tibia is unicolorous, gonocoxite without basal lobe, eyes are bare, costa not extending much beyond tip of R4+5, tip of R4+5 is beyond tip of Cu1, hind tibia with long and barbed terminal setae and with terminal comb, wing unmarked, and anal tergite is simple. Among the species of this genus recorded from Europe, the present species is most closely related to *nigropunctata* (Staeger) in body coloration, but differs from it in the shape and structure of gonostylus (cf: Pinder, 1978, Fig.83C) and in the absence of basal setigerous pad of gonocoxite. Among the chironomid species recorded from Japan, *Pentaneura alba* Tokunaga, 1937, seems to belong also to this genus as pointed out by Fittkau (1962, p.274), but it differs from the present species in body coloration (almost entirely white) and in the value of mLR (40/68, or 0.59 in alba, 0.89-1.02 in the present species).

EXPLANATION OF PLATES

Plate 1. A. *Okayamayusurika kojimaspinosa* gen. et sp. nov. Male. A1: head. A2: antepronotum. A3: wing. A4: scutum and scutellum. A5: tip of front tibia. A6: tip of middle tibia. A7: tip of hind tibia. A8: abdominal tergites II, III and IV, showing bases of setae. A9: hypopygium. A10: gonostylus. B. *Smittia kojimagrandis* sp. nov. Male. B1: antepronotum. B2: scutum and scutellum, showing bases of setae. B3: wing. B4: tip of front tibia. B5: tip of middle tibia. B6: tip of hind tibia. B7: abdominal tergites II, III and IV. B8: hypopygium.

Plate 2. *Diamesa matuimpedita*, sp. nov. Male. 1: head. 2: antenna. 3: antepronotum. 4: wing. 5: scutum and scutellum. 6: tip of front tibia. 7: tip of middle tibia. 8: tip of hind tibia. 9: hind tarsus IV and V. 10: hypopygium, dorsal view. 11: do, ventral view.

Plate 3. *Diamesa toyamaflexa*, sp. nov. Male. 1. head. 2: antepronotum. 3: scutum and scutellum. 4: wing. 5: tip of front tibia. 6: tip of middle tibia. 7: tip of hind tibia. 8: tarsus IV and V of front (f), middle (m), and hind (h) leg. 9: hypopygium. 10: gonostylus, ventral view.

Plate 4. A. *Krenopelopia yunouresia*, sp. nov. Male. A1: head. A2: antepronotum. A3: wing. A4: scutum and scutellum. A5: tip of front tibia. A6: tip of middle tibia. A7: tip of hind tibia. A8: hypopygium. Female. A9: head. A10: cercus. A11: spermathecae. **B. *Pseudosmittia* sp. kojimatertia.** Male. B1. antepronotum. B2: scutum and scutellum. B3: tip of front tibia. B4: abdominal tergites II, III and IV. B5: hypopygium.

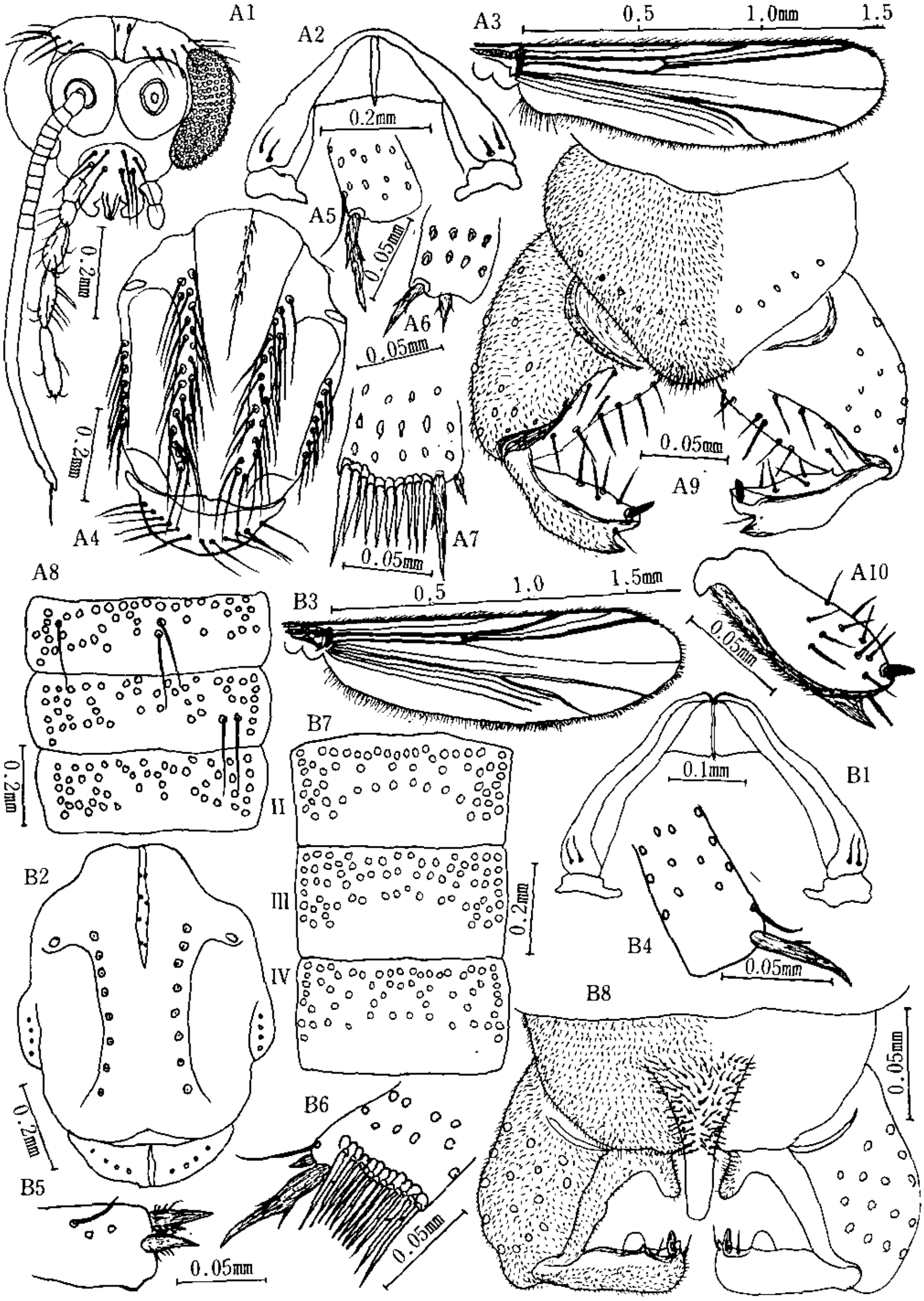


Plate 1. A. *Okayamayusurika kojimaspinosa*, sp. nov.
B. *Smittia kojimagrandis*, sp. nov.

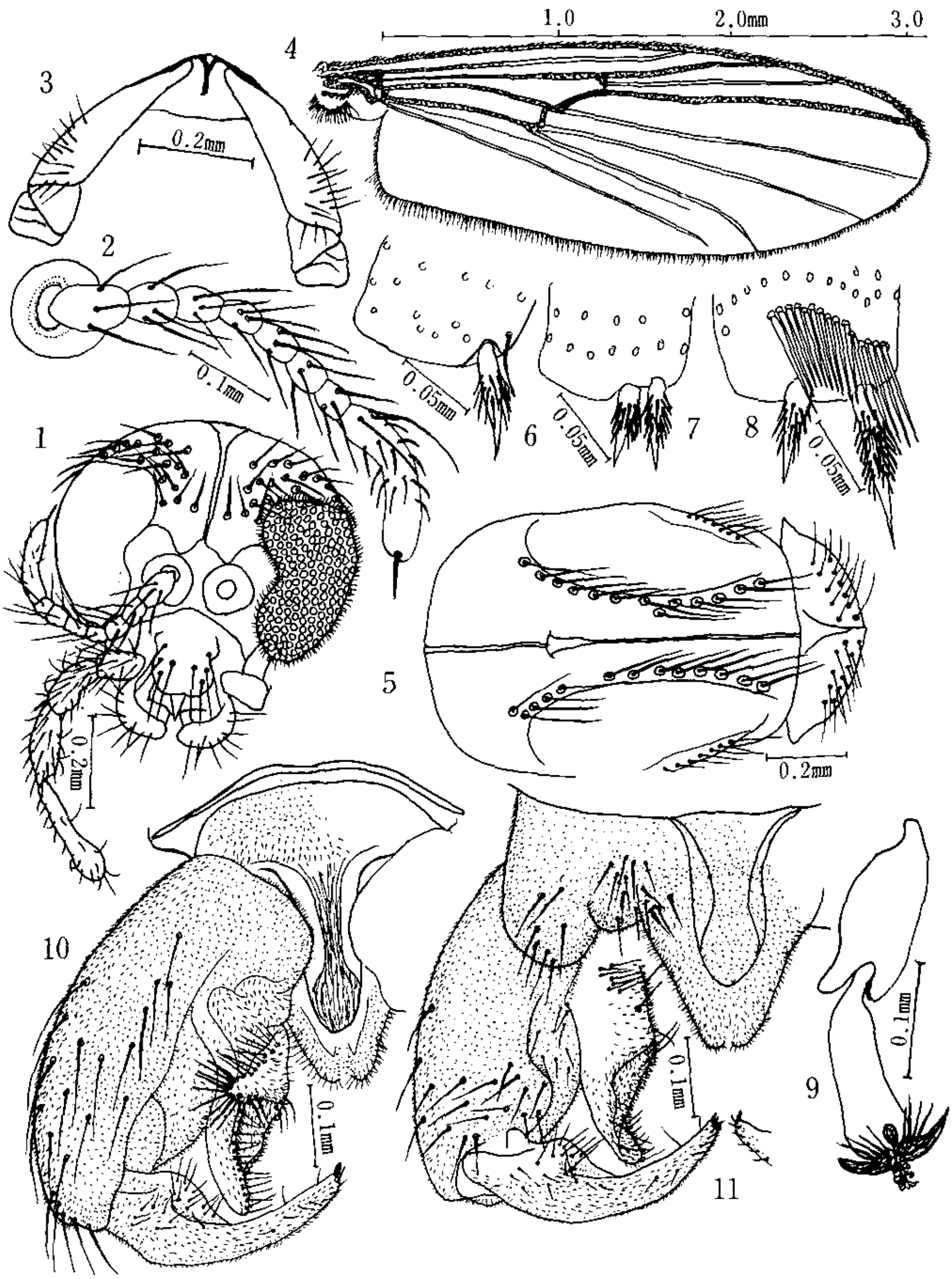


Plate 2. *Diamesa matuimpedita*, sp. nov.

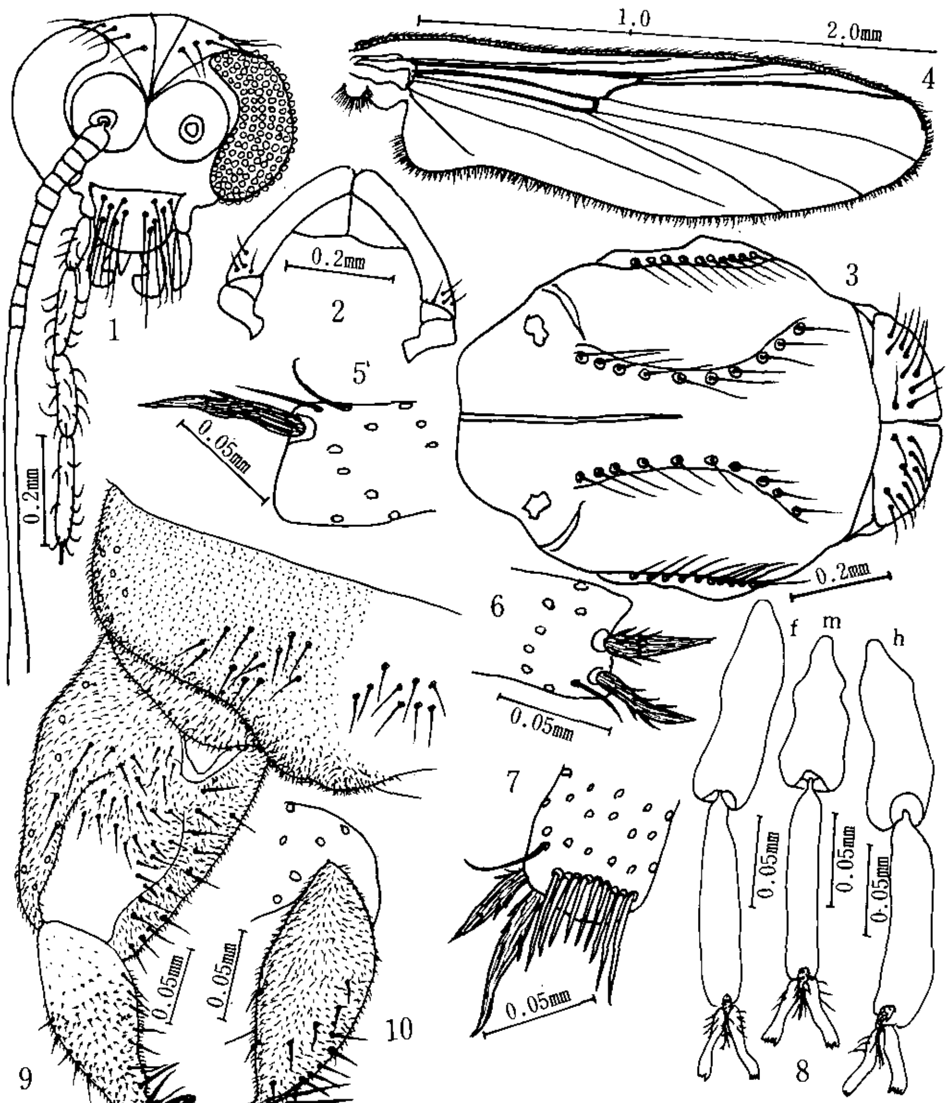


Plate 3. *Diamesa toyamaflexa*, sp. nov.

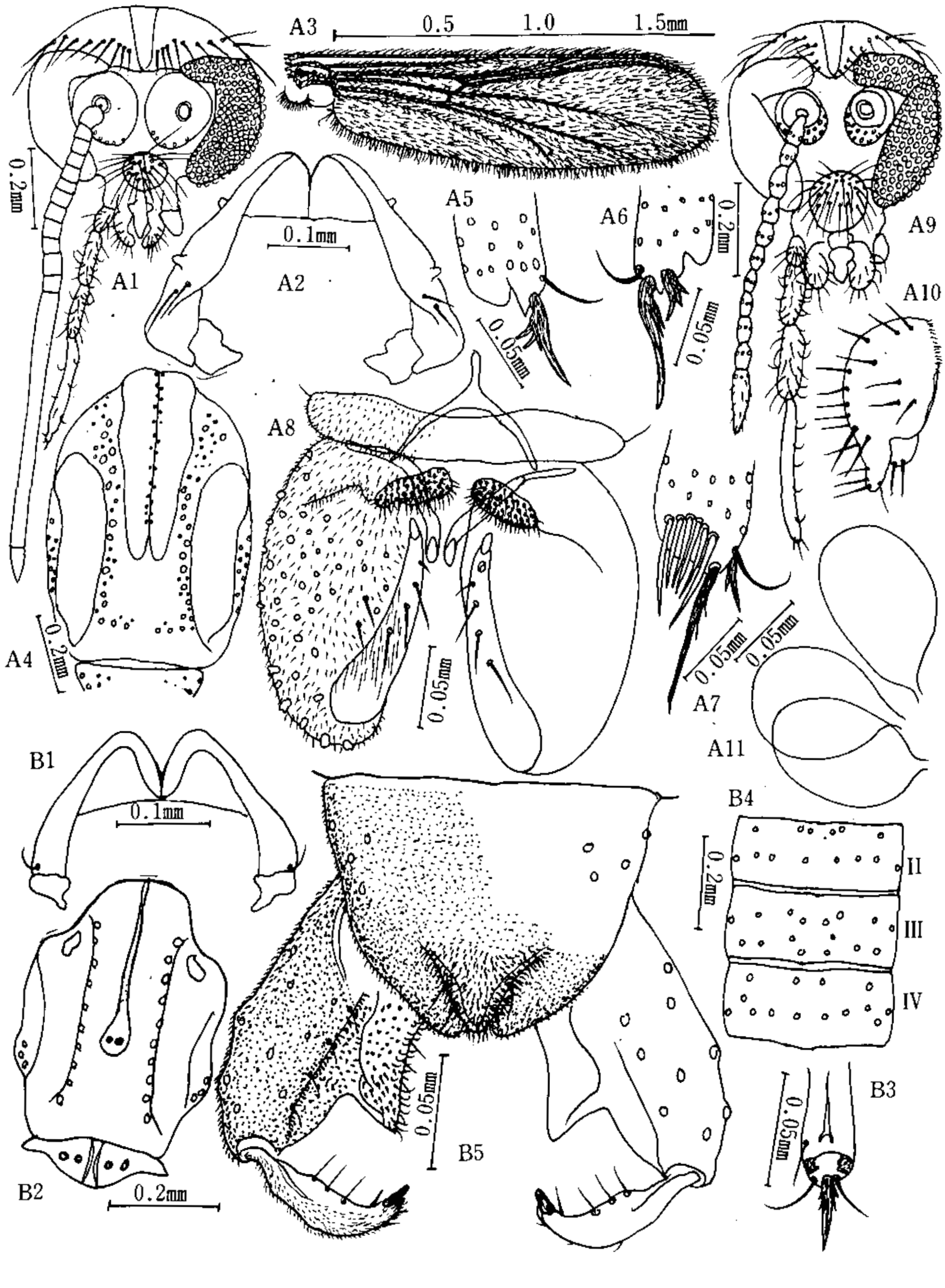


Plate 4. A. *Krenopelopia yunouresia*, sp. nov.
B. *Pseudosmittia* sp. kojimatertia

日本及び東アジア産ユスリカ科のカタログと雄成虫の検索表

佐々　学[1]

ユスリカとはDiptera目のユスリカ科に属する昆虫の総称で，その幼虫は陸上のほとんどあらゆる水域に生息し，その種類もおびただしく，すでに全世界から数千の種が記載されている。しかしその発育史は比較的簡単で，卵，幼虫，サナギ，成虫の４期よりなり，成虫は蚊のように吸血することもなく，交尾した雌は幼虫時代に蓄えた養分を原料に産卵する。環境科学の立場からみれば，ユスリカ類は湖沼，池，水田，河川，下水溝，などに幼虫がおびただしく発生し，水底の藻類やヘドロをたべて成長し，成虫になって大量に脱出したり，魚などの餌となって水の自然浄化に大きな役割をしている益虫である。また，その各種類が水の化学的，物理的，生物学的な環境に応じて厳密に住みわけているため，水質指標生物として，特に河川や湖沼の下水による汚染度の推定に極めて有用である。しかしその反面，汚染の進んだ川や湖から成虫が大量に発生して，周辺に住む住民に不快害虫として嫌われる事例が多く，その駆除がしばしば要請されている。さらに近年特に我が国においてその成虫の死がいないし排せつ物の吸入による気管支ぜん息の発生が注目されている。

この報告は1988年11月までに日本及び東アジア地域(中国，台湾，韓国，樺太を含む)から記載されたユスリカ科Chironomidaeの昆虫の種類を亜科，族，属，亜属などの分類体系に整理して，それを記録した文献を添えたカタログをPart 1とし，その雄成虫の形態による検索表をPart 2にまとめた。さらに従来未記録であったユスリカの数種についての記載をPart 3に挙げ，これらの文献と索引を添えた。

この地域のユスリカについてはハンガリーのKiefferが1912年に台湾から14種(すべて新種)，1916年に台湾から35種(うち新種24)，1921年にフィリピンから５種(すべて新種)，台湾から27種(うち新種17，未記録種２)を記載しているが，その大部分は記載や図が不完全，ないし不十分であるため，現在のどの属ないし種に該当するのか不明なものが多い。したがって，そのうち後の研究者によって再記載された種を除いてはあえてそれらを引用しなかった。

その後，徳永雅明が1933～1964年にかけて現在の日本，及び台湾，樺太，ミクロネシアなどのユスリカ科について膨大な研究成果を出版された。佐々・山本(1977)はそれまでに記載された日本産ユスリカ種のリストをまとめたが，それによれば台湾，樺太を除く現在

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の日本領からすでに約160種が主として徳永により記録されていた。

私どもの日本産ユスリカの分類，生態，分布，水質指標性，病害などに関する研究は主として国立公害研究所において1977年から開始され，その後私が帝京大学，富山医科薬科大学などに転出した後も同研究所の安野正之，岩熊敏夫，菅谷芳雄，上野隆平らの協力を得て今日まで続けられてきた。巻末の文献に挙げられているように，本報告を含めて既に35編，合計して1,376頁の分類学的研究論文と，さらに約20の解説文などが出版された。また，私共の共同研究者によりユスリカ類が気管支ぜん息患者の発作を引き起こすアレルゲンとして日本各地で重要な役割をしていることが初めて明らかにされた。

日本に産するユスリカの種類については，巻末文献に挙げたように橋本，山本，西田らの研究があり，韓国でも Ree & Kim の研究が出版されている。また，日本において記載された種類について欧米などの分類学者がそれを引用してい属名や種小名を改めた研究もいくつかある。外国人による研究のなかで，我が国の下水や都市河川などに最も普通に発生し，それまで日本人研究者達が*Chironomus dorslis*(Meigen)とよんでいた種類が新種であり，それを*Chironomus yoshimatsui*と名付けて記載した Martin & Sablette(1972)の論文が特に注目される。

このようにして日本及び東アジア地区から今日までに記録されたユスリカの種類は合計して480となり，そのうち349(72.7%)は一応この地区の特産種とみなされて，欧米豪などからは記録されていない。そのうち1966年以前に記録されたものは242種(50.4%)，それ以後のものは238種(49.6%)で，これらのうち佐々，及び共同研究者が記録した新種，ないし未記録種はその過半数を占めており，新種だけでも196種に達した。しかし，今回のまとめはあくまで中間的なもので，さらに調査採集が進めば，この地区から1,000を越える種が記録されることは，当然予測されることである。

なお，ユスリカ類の種を幼虫だけの検索で同定しようとする試みは今後とも避けるべきで，日本でもそのために湖沼や河川に産する種の同定を誤ったり，同じ属の別種をいくつも同一種と見なしてしまったりして，無意味どころか，有害な結論をだしてしまったといった研究所報告がいくつもあることは残念である。幼虫材料を採集した際，それを研究室で飼育して，雄，雌，サナギを含めた標本で同定をしたい。

しかし，ユスリカをはじめとして，生物の種とはその外部形態だけで識別することができない場合もあるし，近縁の群同士の間では種としての区別さえ不明確なこともある。ましてや，それまでの不完全な記載を根拠に手持ちの標本からそれと同一種と判断したり，別種とみなして新種を作ったりせざるを得ないのが今回のような古典的な分類学の立場である。だが，それはこれを基盤として人生への応用価値の高い環境科学や，医学，農学などの分野にユスリカの研究を進めていくためにはぜひ必要な第一歩なのである。

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※第19号　陸水域の富栄養化に関する総合研究(Ⅲ)－－霞ヶ浦(西浦)の湖流－－昭和53，54年度.(1981)
※第20号　陸水域の富栄養化に関する総合研究(Ⅳ)－－霞ヶ浦流域の地形，気象水文特性およびその湖水環境に及ぼす影響－－昭和53，54年度.(1981)
第21号　陸水域の富栄養化に関する総合研究(Ⅴ)－－霞ヶ浦流入河川の流出負荷量変化とその評価－－昭和53，54年度.(1981)
第22号　陸水域の富栄養化に関する総合研究(Ⅵ)－－霞ヶ浦の生態系の構造と生物現存量－－昭和53，54年度.（1981)
第23号　陸水域の富栄養化に関する総合研究(Ⅶ)－－湖沼の富栄養化状態指標に関する基礎的研究－－昭和53，54年度.(1981)
第24号　陸水域の富栄養化に関する総合研究(Ⅷ)－－富栄養化が湖利用に及ぼす影響の定量化に関する研究－－昭和53，54年度.(1981)
第25号　陸水域の富栄養化に関する総合研究(Ⅸ)－－Microcyctis（藍藻類)の増殖特性－－昭和53，54年度.(1981)

第26号　陸水域の富栄養化に関する総合研究(X)－－藻類培養試験法によるAGPの測定－－昭和53, 54年度.(1981)
第27号　陸水域の富栄養化に関する総合研究(XI)－－研究総括－－昭和53, 54年度.(1981)
第28号　複合大気汚染の植物影響に関する研究－－昭和54, 55年度 特別研究報告.(1981)
※第29号　Studies on chironomid midges of the Tama River.(1981)
Part 3. Species of the subfamily Orthocladiinae recorded at the summer survey and their distribution in relation to the pollution with sewage waters.
Part 4. Chironomidae recorded at a winter survey.
(多摩川に発生するユスリカ類の研究
－－第3報　夏期の調査で見出されたエリユスリカ亜科Orthocladiinae 各種の記載と,その分布の下水汚染度との関係について
－－第4報　南浅川の冬期の調査で見出された各種の分布と記載)
※第30号　海域における富栄養化と赤潮の発生機構に関する基礎的研究－－昭和54, 55年度 特別研究報告.(1982)
※第31号　大気汚染物質の単一および複合汚染の生体に対する影響に関する実験的研究－－昭和55年度 特別研究報告.(1981)
第32号　スモッグチャンバーによる炭化水素-窒素酸化物系光化学反応の研究－－環境大気中における光化学二次汚染物質生成機構の研究（フィールド研究１）－－昭和54年度 特別研究中間報告.(1982)
第33号　臨海地域の気象特性と大気拡散現象の研究－－大気運動と大気拡散過程のシミュレーション－－昭和55年度 特別研究報告.(1982)
※第34号　環境汚染の遠隔計測･評価手法の開発に関する研究--昭和55年度 特別研究報告.(1982)
第35号　環境面よりみた地域交通体系の評価に関する総合解析研究.(1982)
※第36号　環境試料による汚染の長期モニタリング手法に関する研究－－昭和55, 56年度 特別研究報告.(1982)
※第37号　環境施策のシステム分析支援技術の開発に関する研究.(1982)
第38号　Preparation, analysis and certification of POND SEDIMENT certified reference material.(1982)
(環境標準試料｢池底質｣の調整, 分析及び保証値)
※第39号　環境汚染の遠隔計測･評価手法の開発に関する研究－－昭和56年度 特別研究報告.(1982)
第40号　大気汚染物質の単一及び複合汚染の生体に対する影響に関する実験的研究－－昭和56年度 特別研究報告.(1983)
※第41号　土壌環境の計測と評価に関する統計学的研究.(1983)
※第42号　底泥の物性及び流送特性に関する実験的研究.(1983)
※第43号　Studies on chironomid midges of the Tama River.(1983)
Part 5. An observation on the distribution of Chironominae along the main stream in June with description of 15 new species.
Part 6. Description of species of the subfamily Orthocladiinae recovered from the main stream in the June survey.
Part 7. Additional species collected in winter from the main stream.
(多摩川に発生するユスリカ類の研究
－－第5報　本流に発生するユスリカ類の分布に関する６月の調査成績とユスリカ亜科に属する15新種等の記録
－－第6報　多摩本流より６月に採集されたエリユスリカ亜科の各種について
－－第7報　多摩本流より３月に採集されたユスリカ科の各種について)
第44号　スモッグチャンバーによる炭化水素-窒素酸化物系光化学反応の研究－－環境大気中における光化学二次汚染物質生成機構の研究（フィールド研究２）－－昭和54年度 特別研究中間報告.(1983)
第45号　有機廃棄物, 合成有機化合物, 重金属等の土壌生態系に及ぼす影響と浄化に関する研究－－昭和53～55年度 特別研究総合報告.(1983)
※第46号　有機廃棄物, 合成有機化合物, 重金属等の土壌生態系に及ぼす影響と浄化に関する研究－－昭和54, 55年度 特別研究報告 第１分冊.(1983)
※第47号　有機廃棄物, 合成有機化合物, 重金属等の土壌生態系に及ぼす影響と浄化に関する研究－－昭和54, 55年度 特別研究報告 第２分冊.(1983)
※第48号　水質観測点の適正配置に関するシステム解析.(1983)
第49号　環境汚染の遠隔計測･評価手法の開発に関する研究－－昭和57年度 特別研究報告.(1984)
※第50号　陸水域の富栄養化防止に関する総合研究(Ｉ)－－霞ヶ浦の流入負荷量の算定と評価－－昭和55～57年度 特別研究報告.(1984)

※第51号　陸水域の富栄養化防止に関する総合研究(Ⅱ)－－霞ヶ浦の物質循環とそれを支配する因子－－昭和55～57年度 特別研究報告.(1984)
※第52号　陸水域の富栄養化防止に関する総合研究(Ⅲ)－－霞ヶ浦高浜入における隔離水界を利用した富栄養化防止手法の研究－－昭和55～57年度 特別研究報告.(1984)
第53号　陸水域の富栄養化防止に関する総合研究(Ⅳ)－－霞ヶ浦の魚類及び甲かく類現存量の季節変化と富栄養化－－昭和55～57年度 特別研究報告.(1984)
※第54号　陸水域の富栄養化防止に関する総合研究(Ⅴ)－－霞ヶ浦の富栄養化現象のモデル化－－昭和55～57年度 特別研究報告.(1984)
第55号　陸水域の富栄養化防止に関する総合研究(Ⅵ)－－富栄養化防止対策－－昭和55～57年度 特別研究報告.(1984)
第56号　陸水域の富栄養化防止に関する総合研究(Ⅶ)－－湯ノ湖における富栄養化とその防止対策－－昭和55～57年度 特別研究報告.(1984)
※第57号　陸水域の富栄養化防止に関する総合研究(Ⅷ)－－総括報告－－昭和55～57年度 特別研究報告.(1984)
第58号　環境試料による汚染の長期的モニタリング手法に関する研究－－昭和55～57年度 特別研究総合報告.(1984)
第59号　炭化水素-窒素酸化物-硫黄酸化物系光化学反応の研究－－光化学スモッグチャンバーによるオゾン生成機構の研究－－大気中における有機化合物の光酸化反応機構の研究－－昭和55～57年度 特別研究報告(第1分冊).(1984)
第60号　炭化水素-窒素酸化物-硫黄酸化物系光化学反応の研究－－光化学エアロゾル生成機構の研究－－昭和55～57年度 特別研究報告(第2分冊).(1984)
第61号　炭化水素-窒素酸化物-硫黄酸化物系光化学反応の研究－－環境大気中における光化学二次汚染物質生成機構の研究(フィールド研究1)－－昭和55～57年度 特別研究報告(第3分冊).(1984)
第62号　有害汚染物質による水界生態系のかく乱と回復過程に関する研究－－昭和56～58年度 特別研究中間報告.(1984)
※第63号　海域における富栄養化と赤潮の発生機構に関する基礎的研究－－昭和56年度 特別研究報告.(1984)
※第64号　複合大気汚染の植物影響に関する研究－－昭和54～56年度 特別研究総合報告.(1984)
※第65号　Studies on effects of air pollutant mixtures on plants－－Part 1.(1984)
(複合大気汚染の植物に及ぼす影響－－第1分冊)
※第66号　Studies on effects of air pollutant mixtures on plants－－Part 2.(1984)
(複合大気汚染の植物に及ぼす影響－－第2分冊)
※第67号　環境中の有害物質による人の慢性影響に関する基礎的研究－－昭和54～56年度 特別研究総合報告.(1984)
※第68号　汚泥の土壌還元とその環境影響に関する研究－－昭和56～57年度 特別研究報告.(1984)
※第69号　中禅寺湖の富栄養化現象に関する基礎的研究.(1984)
※第70号　Studies on chironomid midges in lakes of the Nikko National Park.(1984)
Part Ⅰ. Ecological studies on chironomids in lakes of the Nikko National Park.
Part Ⅱ. Taxonomical and morphological studies on the chironomid species collected from lakes in the Nikko National Park.
(日光国立公園の湖沼のユスリカに関する研究
－－第1部 日光国立公園の湖のユスリカの生態学的研究
－－第2部 日光国立公園の湖沼に生息するユスリカ類の分類学的, 生態学的研究)
※第71号　リモートセンシングによる残雪及び雪田植生の分布解析.(1984)
第72号　炭化水素-窒素酸化物-硫黄酸化物系光化学反応の研究－－環境大気中における光化学二次汚染物質生成機構の研究(フィールド研究2)－－昭和55～57年度 特別研究報告(第4分冊).(1985)
※第73号　炭化水素-窒素酸化物-硫黄酸化物系光化学反応の研究－－昭和55～57年度 特別研究総合報告.(1985)
※第74号　都市域及びその周辺の自然環境に係る環境指標の開発に関する研究. 環境指標－その考え方と作成方法－昭和59年度 特別研究報告.(1984)
第75号　Limnological and environmental studies of elements in the sediment of Lake Biwa.(1985)
(琵琶湖底泥中の元素に関する陸水学及び環境化学的研究)
第76号　A study on the behavior of monoterpens in the atmosphere.(1985)
(大気中モノテルペンの挙動に関する研究)
第77号　環境汚染の遠隔計測・評価手法の開発に関する研究－－昭和58年度 特別研究報告.(1985)
第78号　生活環境保全に果たす生活者の役割の解明.(1985)
第79号　Studies on the method for long term environmental monitoring－－Research report in 1980-1982.(1985)
(環境試料による汚染の長期的モニタリング手法に関する研究)
※第80号　海域における赤潮発生のモデル化に関する研究－－昭和57/58年度 特別研究報告.(1985)

※第81号　環境影響評価制度の政策効果に関する研究－－地方公共団体の制度運用を中心として. (1985)
※第82号　植物の大気環境浄化機能に関する研究－－昭和57～58年度 特別研究報告. (1985)
第83号　Studies on chironomid midges of some lakes in Japan. (1985)
(日本の湖沼のユスリカの研究)
※第84号　重金属環境汚染による健康影響評価手法の開発に関する研究－－昭和57～59年度 特別研究総合報告. (1985)
第85号　Studies on the rate constants of free radical reactions and related spectroscopic and thermochemical parameters. (1985)
(フリーラジカルの反応速度と分光学的及び熱力学的パラメーターに関する研究)
第86号　ＧＣ／ＭＳスペクトルの検索システムに関する研究. (1986)
第87号　光化学二次汚染物質の分析とその細胞毒性に関する研究－－昭和53～58年度 総合報告. (1986)
※第88号　都市域及びその周辺の自然環境等に係る環境指標の開発に関する研究Ⅱ. 環境指標－応用例とシステム－－昭和59年度 特別研究報告. (1986)
第89号　Measuring the water quality of Lake Kasumigaura by LANDSAT remote sensing. (1986)
(ＬＡＮＤＳＡＴリモートセンシングによる霞ヶ浦の水質計測)
第90号　ナショナルトラスト運動にみる自然保護にむけての住民意識と行動－－知床国立公園内100平方メートル運動と天神崎市民地主運動への参加者の分析を中心として. (1986)
第91号　Economic analysis of man s utilization of environmental resources in aquatic environments and national park regions. (1986)
(人間による環境資源利用の経済分析－水環境と国立公園地域を対象にして)
第92号　アオコの増殖及び分解に関する研究. (1986)
※第93号　汚泥の土壌還元とその環境影響に関する研究(Ⅰ)－－昭和58～59年度 特別研究総合報告 第１分冊. (1986)
※第94号　汚泥の土壌還元とその環境影響に関する研究(Ⅱ)－－昭和58～59年度 特別研究総合報告 第２分冊. (1986)
※第95号　自然浄化機能による水質改善に関する総合研究(Ⅰ)－－汚濁負荷の発生と流出･流達－－昭和58～59年度 特別研究報告. (1986)
※第96号　自然浄化機能による水質改善に関する総合研究(Ⅱ)－－水草帯･河口域･池沼の生態系構造と機能－－昭和58～59年度 特別研究報告. (1986)
※第97号　自然浄化機能による水質改善に関する総合研究(Ⅲ)－－水路及び土壌による水質の浄化－－昭和58～59年度 特別研究報告. (1986)
第98号　自然浄化機能による水質改善に関する総合研究(Ⅳ)－－自然浄化機能を活用した処理技術の開発と応用－－昭和58～59年度 特別研究報告. (1986)
第99号　有害汚染物質による水界生態系のかく乱と回復過程に関する研究－－昭和56～59年度 特別研究総合報告. (1986)
第100号　バックグラウンド地域における環境汚染物質の長期モニタリング手法の研究－－特定汚染選択的検出法及び高感度分析技術の開発－－昭和58～60年度 特別研究報告. (1986)
第101号　複合ガス状大気汚染物質の生体影響に関する実験的研究－－昭和57～60年度 特別研究報告. (1986)
第102号　地球規模大気質変動に関する予備的研究. (1986)
第103号　環境調和型技術としての電気自動車の評価に関する基礎的研究. (1987)
第104号　Studies on chironomid midges in lakes of the Akan National Park. (1987)
(北海道阿寒国立公園の湖におけるユスリカ相の研究)
第105号　畑地土壌における水分と諸元素の動態. (1987)
※第106号　筑波研究学園都市における景観評価と景観体験に関する研究. (1987)
第107号　遠隔計測による環境動態の評価手法の開発に関する研究 －－昭和59～60年度 特別研究報告. (1987)
第108号　植物の大気環境浄化機能に関する研究－－昭和57～60年度 特別研究総合報告. (1987)
第109号　地域環境評価のための環境情報システムに関する研究. (1987)
第110号　海域における赤潮発生のモデル化に関する研究－－昭和59～60年度 特別研究総合報告. (1987)
※第111号　Application of X-ray photoelectron spectroscopy to the study of silicate minerals. (1987)
(ケイ酸塩鉱物研究へのＸ線光電子分光法の応用)
第112号　光化学汚染大気中における有機エアロゾルに関する研究－－有機エアロゾルの生成と挙動に関する研究－－昭和58～61年度 特別研究報告. (1988)
第113号　光化学汚染大気中における有機エアロゾルに関する研究－－昭和58～61年度 特別研究総合報告. (1988)
第114号　水界生態系に及ぼす有害汚染物質の影響評価に関する研究－－昭和60～61年度 特別研究報告. (1988)

第115号 複合ガス状大気汚染物質の生体影響に関する実験的研究－－昭和57～61年度 特別研究総合報告.(1988)
※第116号 自然浄化機能による水質改善に関する総合研究(Ⅴ)－－汚濁負荷の発生と流出・流達－－昭和58～61年度 特別研究報告.(1988)
※第117号 自然浄化機能による水質改善に関する総合研究(Ⅵ)－－湖沼の生態系構造と自然浄化－－－－昭和60～61年度 特別研究報告.(1988)
第118号 自然浄化機能による水質改善に関する総合研究(Ⅶ)－－自然浄化機能を活用した水路・土壌による浄化と処理技術の開発－－昭和60～61年度 特別研究報告.(1988)
※第119号 自然浄化機能による水質改善に関する総合研究(Ⅷ)－－自然浄化システムの評価方法－－昭和60～61年度 特別研究報告.(1988)
第120号 自然浄化機能による水質改善に関する総合研究(Ⅸ) 昭和58～61年度 特別総合研究報告(1988)
第121号 Studies on the chironomid midges of lakes in Southren Hokkaido. (1988)
(北海道南部の湖におけるユスリカ相の研究)
第122号 擬似ランダム変調CWライダーの開発とフィールド観測への応用.(1989)
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(日本及び東アジア産ユスリカ科のカタログと雄成虫の検索表)

※ 残部なし

Report of Special Research Project of the National Institute for Environmental Studies:

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No. 2* Studies on evaluation and amelioration of air pollution by plants—Progress report in 1976-1977.(1978)

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* in Japanese
※ *out of stock*

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